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# WILDLIFE IN NORTH CAROLINA

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# Hunting Through The Yellowed Pages

*by Jim Dean*

While browsing through a flea market recently, I ran across a stack of old outdoor magazines. Casually, I flipped one of them over and there on the back cover of the February 1952 *Sports Afield* was a color photograph of Gary Cooper sitting in the back of a wooden runabout with his hand firmly on the throttle of a green Johnson Seahorse. Cooper has on a cowboy hat with a rattlesnake hide for a band, and his steely eyes are scanning the distant horizon. I read the caption. "On location in Florida, Gary Cooper, star of 'Distant Drums,' makes the 8-mile trip into the Everglades."

Listen, I was there 33 years ago when ol' Coop almost got tossed into a pit full of squirming gators. I saw him swim through quicksand to rescue some troopers, and I was real glad when he finally licked the Seminoles. Oh yeah, in 1952, a 5-horse Johnson retailed for $187.50.

Naturally, I bought several of the old magazines and spent an evening chuckling over ads and articles that took me back to the years when I first contracted this lifelong ailment that causes me to go fishing and hunting. It's all Gary's fault. Well, some of it, anyway.

If you ever get a chance to pick up a few of these old outdoor magazines—they're aren't expensive since most aren't old enough to be collectible—I recommend that you do it. You're almost guaranteed a few hours of pleasant recollections.

*Debbie Conger*

In that same issue of *Sports Afield*, there's an article by famous archer Howard Hill about hunting big game in Africa. Howard is shown holding a massive lemonwood long bow and port oxford cedar arrows (no recurves back then, and Heaven knows what he would have thought of a compound bow). There's also one of the series of hilarious ads Ed Zern wrote touting Nash automobiles and their reclining seats. Today's outdoorsmen know of Zern from his humorous "Exit Laughing" columns in *Field & Stream*, but few recall that he got his start writing advertising copy, and especially outlandish copy for the Nash-Kelvinator Corporation. Oh yes, in the classified section are countless advertisements for chinchillas—prevailing sentiment in 1952 was that raising fur coats was a sure-fire scheme.

Many well-known outdoor writers and artists appear in these older outdoor magazines. The November 1945 *Field & Stream* features a cover by Lynn Bogue Hunt and articles by Nash Buckingham, Jack O'Connor, Russell Annabel and Ted Trueblood (Zern frequently referred to him as Ted Truecorpuscles). In that issue, you could order hollow pine Wildfowler Decoys for $36 a dozen or get a book of 26 great combat action photos of World War II for only 10 cents.

The February 1948 *Sports Afield* features a classic bit of comedy by the late Havilah Babcock about raising catalpa worms. Babcock wrote many amusing books that have stood the test of time. For many years he was an English professor at The University of South Carolina, but he also taught at Elon College in North Carolina as a younger man. On the back cover of that issue is a full-page ad claiming that "More doctors smoke Camels than any other cigarette." Inside, a book list includes a new copy of Nash Buckingham's "Mark Right" for $2.50—try to find that on a collector's list today for pocket change.

In some instances, the advertisements make you regret your lack of foresight. In the October 1955 *Sports Afield*, you can buy a Winchester Model 12 for $93.85, and if that's too steep, you can put down just $9.85 and pay $5.50 for 18 months. Other ads are merely wistful. A photograph of the 1954 Darlington 500 shows 52 stock cars including such speedsters as a Buick, Cadillac, Chrysler, Dodge, Ford, Hudson, Mercury, Nash, Oldsmobile, Plymouth and Studebaker. Imagine Bill Elliott in a Studebaker. Actually, most of them would outrun today's street vehicles.

In the 1941 *Sports Afield* Hunting Annual, Elmer Keith provides a bit of fodder for modern gun collectors who might be tempted to latch onto one of the Bisley Colt revolver reproductions that have become so popular in 1985. Writes Keith, "The Bisley Colt was never popular in the West, and I seriously doubt if it ever was anywhere on account of its grip, having entirely too much down bend causing the gun to be a very poor pointer for any hip shooting or defense shooting in the dark by the feel of the gun. Further, the trigger guard was large enough for a dog to crawl through...." Oh well, we all have heard that those who don't learn from history are doomed to repeat it.

That issue has a final bit of information that seems a fitting footnote to this column. The 1941-42 federal waterfowl regulations for North Carolina permit a daily bag limit of 10 ducks and three geese, but only one wood duck. While we aren't likely to see any 10-duck or three-goose limits again here anytime soon, it is encouraging to note that the woodies have made a substantial comeback in the Southeast thanks to improving habitat, nestbox programs and enlightened management. The limit is now four birds under certain conditions.

One other thing. Maybe those stacks of *Wildlife In North Carolina* you've got moldering away in the attic will provide a trip down memory lane for some future flea-market prowler. There's got to be some reason we're saving them.

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# WILDLIFE IN NORTH CAROLINA

*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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**Down and semiplume** *feathers help trap air beneath birds' contour feathers. They are some of the best forms of natural insulation. Birds can also fluff up these feathers in very cold weather. This increases the depth of the warm air layer beneath their feathers, and increases insulation.*

# Keeping The Home Fires Burning

*written by Lawrence S. Earley / illustrated by David Williams*

One of nature's elemental dramas is played out each winter as birds and wildlife strive to survive the cold and live off a barren landscape until spring arrives. For warm-blooded animals, staying warm is a result of producing heat and of conserving the heat once it is produced. To do the former, animals must eat and build up fat as an energy reserve for times when food is scarce. To conserve heat, birds and wildlife have inherited several kinds of natural insulation.

Insulation — whether artificial or natural — reduces heat loss by keeping a barrier of air between a heated surface and a cold surface. Since winter temperatures drop far below the body temperatures of warm-blooded animals, most would die of exposure without some form of insulation.

Birds have one of the best kinds of insulation — feathers. Overlapping layers of feathers trap air next to the bird's skin. The body heat of the bird warms this air and the feather layer keeps the heat from dissipating. By fluffing up its feathers, as it does in extremely cold weather, a bird can increase the depth of the warm air layer and improve the insulation.

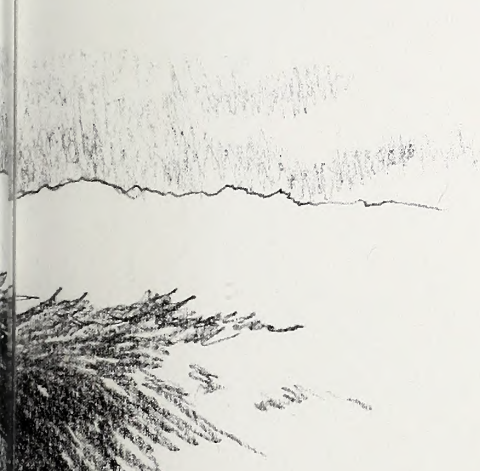
Mammals also have natural insulation — fur and fat. In the fall, triggered by changes in the length of daylight, mammals begin to put on an extra layer of fat and grow thicker coats. Fat works not only as an energy reserve, but as a barrier to the loss of body heat. The result of these changes is that most animals in winter wear a "triple overcoat," as zoologist Frederick Barkalow put it.

For example, beavers grow extra-long guard hairs and a wooly undercoating of fur. So efficient is this winter coat that water almost never touches the skin, even though beavers spend much of their time in the water. In addition, their bodies put on a layer of fat just below the skin. Squirrels also don this triple overcoat. Like beavers, they grow coarse, long hair, an undercoat of softer fur and one extra fatty layer. White-tailed deer grow a thicker coat of hollow hairs, which has great insulating value, and an underfur of finer hair.

Like birds, mammals can increase the insulation of their fur by erecting their hair — an effect known as piloerection. In very cold weather, special muscles contract and the fur is raised. Most biologists say that erect fur increases the depth of the heat layer and that's like adding an extra layer of insulation.

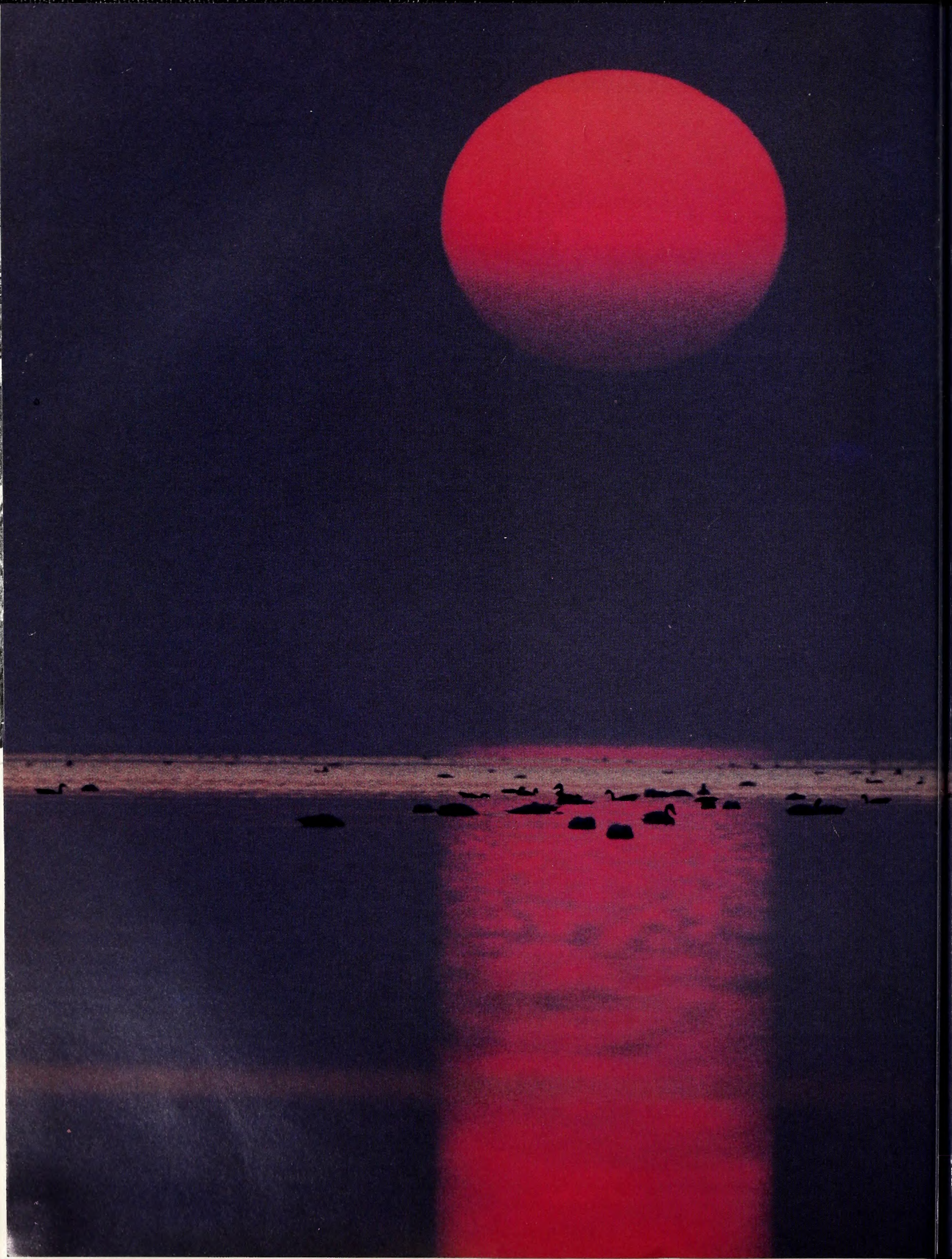
Fur's ability to insulate differs from animal to animal, and even from place to place on an animal's body. The feet of a whitetail carry less hair than its neck or middle body, and are often in contact with snow, ice or freezing water. But a decreased flow of blood to its extremities can reduce the deer's heat loss in those parts and stabilize its temperature.

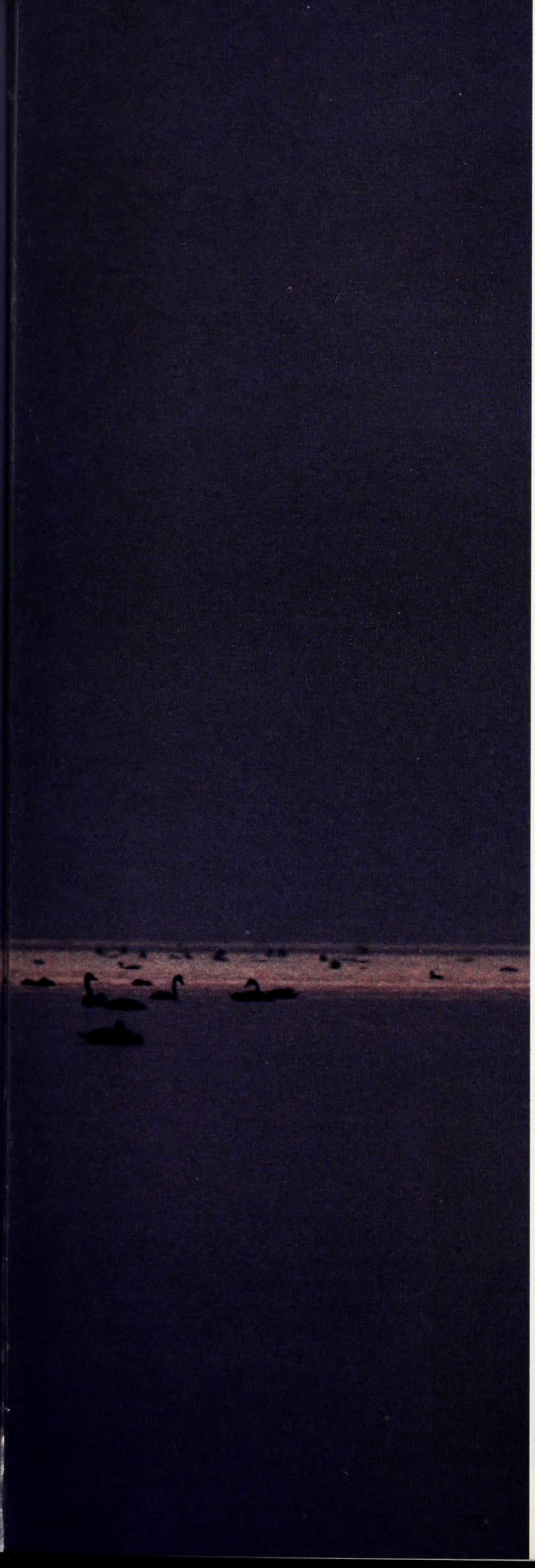
In spite of insulation, many animals do not survive winter. But for those that do manage to keep their inner fires burning until the spring thaw, it is their natural insulation that provides a means to survival. ⊠



***The lowered metabolism*** *of this hibernating woodchuck reduces its body temperature and the amount of heat it loses. But many layers of insulation also protect it from the cold, as the boxes at left show. Two important layers are the increased fat and the thicker fur coat it has grown since the fall. Between the animal's body and the burrow walls is an insulating layer of air. The ground itself protects the woodchuck from cold air temperatures above ground. The leaf litter and snow add a further insulating layer, especially for small rodents that build runways beneath the snow. Even the clouds act as an insulating barrier.*

***Mammals lose heat*** *in four ways — through (a) convection (the movement of air over the animal); (b) evaporation (from the skin through perspiration or from the lungs); (c) conduction (when contact from a cold surface like the ground draws heat from the skin); and (d) radiation (energy lost to cooler surroundings). Insulation (fur, fat, a nest of leaves, a burrow) can reduce heat loss.*





# Mattamuskeet Memories

***Once the goose-hunting capital of the world, the largest natural lake in North Carolina is still a sportsman's paradise that clings to its wild origins.***

*written by Jim Dean,*
*photography by Larry Ditto*

Along U.S. 264, the miles click off as you head past Pantego and Belhaven, crossing the dark cypress and marsh-rimmed creeks and skirting the edges of massive black fields that stretch flat to the horizon. By the time you have passed the workboats moored in the backwaters of Pungo River and Rose Bay and swung north of Swanquarter towards Mattamuskeet, you can already sense that this land has a permanence about it. Approached down the 75-mile swamp-bordered stretch of 264 in the opposite direction from Manns Harbor, or down N.C. 94 from Columbia, the feeling of delicious isolation is even greater.

This land between Albemarle and Pamlico clings stubbornly to its wild origins, and the lake that lies in the belly of Hyde County has done more than its share of clinging. Mattamuskeet is the largest of several sizable natural lakes in this unique "peninsula." Indeed, at approximately 18 miles long and six miles wide and at 40,000 acres, it is the largest natural lake in the state, although it averages only about 2½ feet deep.

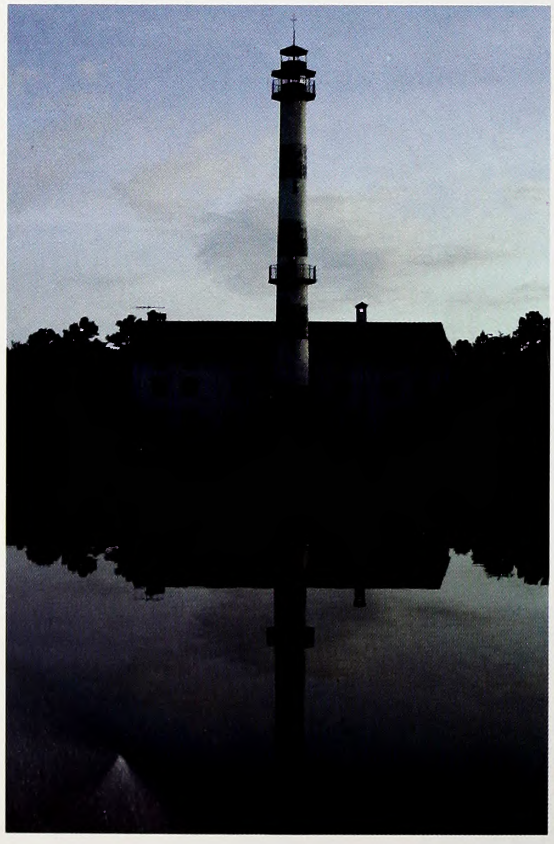
Mattamuskeet's origin has been debated for centuries—some say a meteor created it—but the most likely explanation is found in Indian legend which recalls a severe drought and a fire that burned for 13 moons. Given the vast deposits of peat that lie in the lake bed and surrounding land, such a fire is certainly likely, and it could have left a similar shallow depression. Furthermore, in the years following a fire until waters ultimately filled this giant hole, the area might literally have been a dust bowl. Perhaps it is not ironic that the Indian name for this place translates as "dry dust."

Some of the earliest white settlers in this region saw far more than

***Swans, geese and ducks** rest on the shimmering mirror of Mattamuskeet at sunset within the National Wildlife Refuge. The 40,000-acre lake in Hyde County is a haven for an astonishing number of waterfowl, fish and other wildlife.*

# *Mattamuskeet Memories / this land clings stubbornly to its wild origins*

***Canada geese fly** from the lake to surrounding fields to feed (above). During the lake's brief heyday as the goose hunting capital of the world in the 1960s, the wintering population peaked at over 130,000. The pump station at Mattamuskeet (right) served as a hunting lodge until 1972, and may be reopened.*



a lake here. To them, the potentially rich farmland beneath the shallow waters held great promise. As early as 1789, a board was appointed to study ways to drain the lake, and in 1835, the North Carolina Legislature authorized drainage even though no funds were appropriated. The state tried again in 1909 with a $500,000 bond issue, and canals were dug and a pump station erected, but heavy rains thwarted the attempt.

After two private efforts met similar fates, an 81-year-old multimillionaire, August Hecksher, took over the project in 1925 and installed four centrifugal Corliss engine steam pumps in the station. Capable of pumping 250,000 gallons of water per minute, all canals in the lake bottom could be pumped dry in a day. Encouraged, Hecksher laid out the town of New Holland, built highways and a railroad line, and put 51 tractors into the drained lake to plant rice, buckwheat, popcorn, lespedeza, barley, celery, asparagus, rye, oats, flax, potatoes and the largest acreage of soybeans in the world.

At first, conditions seemed perfect, but Hecksher did not reckon on Mattamuskeet's relentless capability for self preservation. Rains, wind tides and a pumping system that proved unreliable were Hecksher's undoing. True, there were bumper crops but almost invariably the harvesting machinery became mired, and what the water didn't rot, the insects ate. In 1933, Hecksher called it quits and a

ear later the federal government purchased the ake and allowed it to refill.

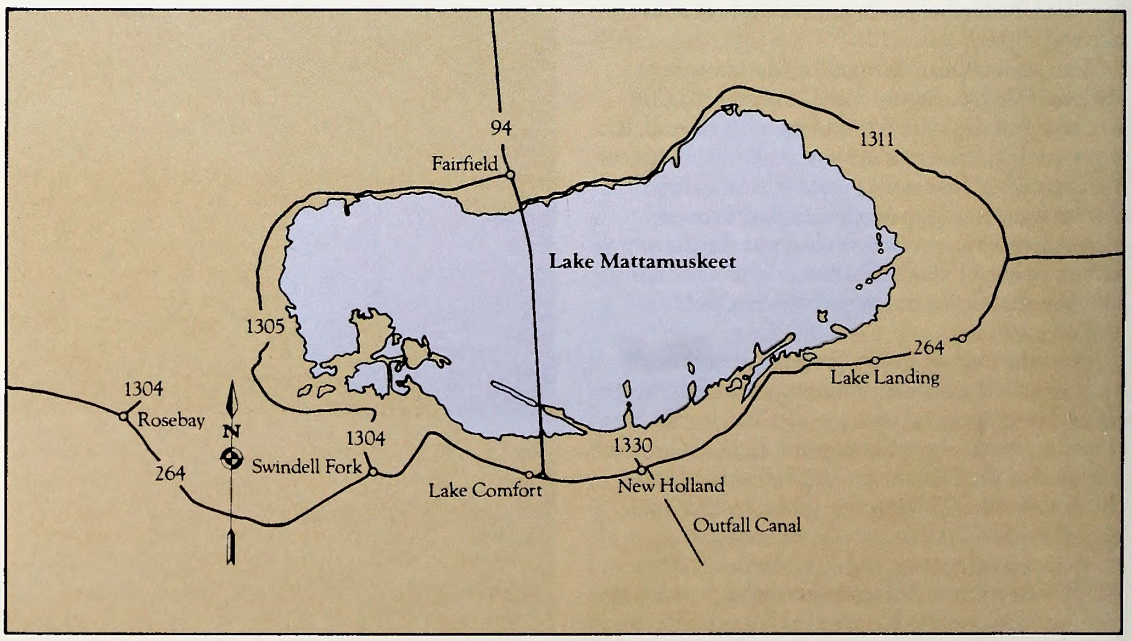
With the establishment of the Mattamuskeet National Wildlife Refuge in 1934 on the 40,000-cre lake and 10,000 surrounding acres of land, the rea rapidly became a waterfowl haven and a sports-nan's paradise. The shallow lake formed a huge natural waterfowl impoundment that attracted ncreasingly vast numbers of ducks and geese which ed not only on the rich freshwater grasses in the ake, but also flew into the surrounding fields to eed on corn.

It was the Canada geese, however, that brought Mattamuskeet a decade of international fame as the goose-hunting capital of the world. During the first winter after the lake refilled, some 12,000 Canadas migrated to the lake, but by 1937, that total had climbed to 48,000 wintering geese. In 1939, the U.S. Fish and Wildlife Service entered into a cooperative agreement with the North Carolina Wildlife Resources Commission through which the Commission operated controlled hunts in 36 blinds

on portions of the refuge. The old pump station was reopened as a hunting lodge. Numbers of wintering geese oscillated from a low of 25,000 geese to as many as 90,000 through the next dozen or so years, but in 1958, the population hit 105,000. During the peak years from 1958 until 1964, the wintering population ranged up to as many as 131,000 and

***Canals around** Lake Mattamuskeet and in the surrounding area are picturesque waterways for small boats (above). Hedgerows and ditches in vast, flat fields in Hyde and adjoining counties afford good bobwhite quail hunting (left) on both private lands and public game lands.*

***Sunlight filters through*** *the early morning fog painting an almost impressionistic scene at one of the many farmhouses typical of those in this eastern North Carolina region (above).*



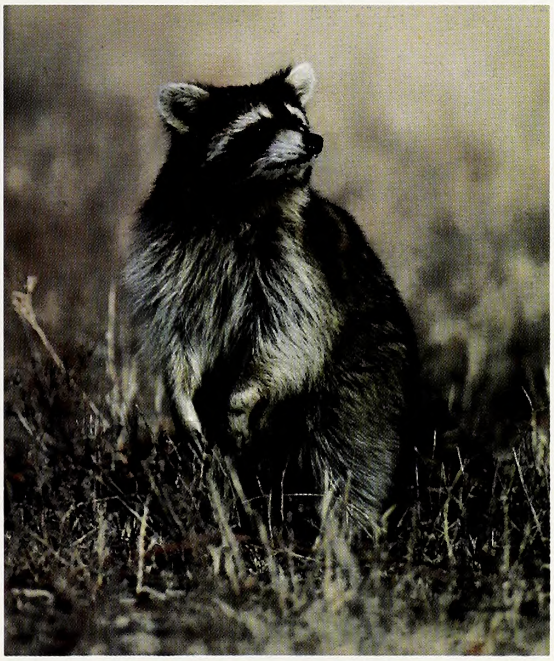
although it began to drop in the mid-1960s, it remained high. Mattamuskeet's heyday, however, ended rather abruptly in 1968 when the number of visiting geese dropped from 70,000 to 21,000.

Many experts speculate that this decline was almost certain to happen, and that this was an unnaturally high cycle for such a relatively small area. At any rate with the wintering Canada population hovering at around 20,000 geese per year, the Wildlife Commission held its last public hunts during the 1972-73 season, and the lodge closed. In the past dozen years, the average number of Canadas wintering on the lake has been about 16,000 (17,000 wintered there in 1985, but only 12,000 were on the lake the previous year).

Hunting pressure both on the lake and on private fields and impoundments around the lake apparently played only a small role in the declining numbers of gesse that visited the area. Waterfowl biologists cite three other reasons. During the late 1960s, farmers in the DelMarVa Peninsula farther north were rapidly converting traditional vegetable crops to corn and soybeans, providing a massive resource of food for geese hundreds of miles closer to their breeding grounds. Meanwhile, farmers in Hyde County, and elsewhere in eastern North Carolina, were switching to early maturing corn crops that were being harvested long before the arrival of the geese each fall. Massive flocks of Canadas enroute to North Carolina began to "shortstop" in the DelMarVa Peninsula and winter there. Meanwhile, at Mattamuskeet, the habitat at the lake was maturing naturally, and cattails, shrubs and even trees began to replace the fertile marshes and grasses that had provided so much food in the refuge itself. Ironically, though the number of wintering geese declined at Mattamuskeet and elsewhere throughout the South, the total population of Canadas in the Atlantic Flyway actually increased and has remained at near record peaks despite heavy hunting pressure in the new wintering grounds farther north.

For a hunter or waterfowl lover who knew Mattamuskeet during its heyday, a winter visit today to the former goose hunting capital of the world is a wistful experience. Two years ago, I returned with my son to Mattamuskeet to hunt one of the private impoundments still operated outside the refuge. It was a good hunt, and the area looked pretty much the same. We drove across the 8-mile causeway that splits the lake as I had done with my grandfather, father and brothers so many years ago, and we visited the old pump station where we had stayed. But something was missing, and it wasn't hard to figure out what it was.

As I stood beside the old pump station, I realized that I could not hear any geese. In fact, except for one lonely V of Canadas in the distant sky over the causeway, I had not even seen any, and that realization brought back a flood of memories. Twenty years earlier, there had been no escape from the



***Freshwater fishing** is often good in the spring and fall in the lake and canals which surround it (above). The shallow waters are ideal for fly fishermen seeking bass and panfish. Many species of wildlife like this raccoon (left) make their homes in and around the lake.*

geese. It was total immersion, and as soon as you got within 20 miles of Mattamuskeet, you could roll down the windows and hear them honking. In late afternoon against a blood-red sky, there were countless flocks of geese as far as you could see heading back to the lake to roost. Half the night, their honking kept you awake in the lodge, and when the bell rang for breakfast at 3:30 the next morning, you joined all the other hunters in the large dining room where you ate eggs, sausage, oyster fritters and washed it down with coffee—all amidst a muted chorus of honking geese which were stirring for the flight to the fields to feed.

We hunted the lake around Christmas almost every year during the late 1950s and early '60s as a

# *Mattamuskeet Memories / once it was the goose-hunting capital of the world*

***Tundra swans roost** at sundown on Lake Mattamuskeet accompanied by Canada geese and a variety of ducks. Although the wintering population of Canada geese has fallen at the lake because these geese now winter farther north, swan and duck populations have increased. A snowy egret (right) takes wing gracefully from cover along the lake's shoreline.*

family outing, and I think our last hunt took place in the declining '67-'68 season just before my grandfather died.

The best of it was in the company of an elderly guide named Lemmie Cahoon. Through a stroke of pure luck, we drew his blind — No. 29 — two years running. He may have been the best of the bunch; he was surely among the most knowledgeable. Even at his advanced age, it was clear that he loved waterfowling. I still have a clear image of him calling ducks as we crouched low in the blind while his yellow lab watched the incoming birds intently through a hole in the side of the blind which had been provided just for that purpose.

Despite the decline of Mattamuskeet as a goose capital, there is still much there for the waterfowler and wildlife enthusiast — even the angler. Over the years, the spring and summer months have provided good bass and panfishing. Crappie and catfishing are still excellent, and although the bass fishing may have declined a bit in recent years as the old canals in the lake's bottom have silted in, it is still good in some parts of the lakes and in the many canals that border the lake. Mattamuskeet provides a special treat for the angler who likes his fishing in traditional doses. You can wade the shallows around the cypress with a flyrod and popping bugs during the spring spawning season, and float the canals or fish the deeper holes with a small boat. Because the lake is

so shallow, it does not attract many big, swift bass boats.

Nor has the waterfowl hunting gone to pot. Indeed, some of it may be better than ever. In 1972 when it became apparent that one of the problems was the maturing of the marshes, refuge personnel began to build waterfowl impoundments around the lake, but still within the refuge. These areas, along with the lake itself, attract an excellent wintering population of ducks and swans. Indeed, since 1973, the duck population increased to such an extent that a small portion of the refuge—some 4,000 acres—was reopened to limited hunting with the 1979-80 season. There are nine 2-day hunts held with hunters selected by a drawing based on advanced applications. Blinds are located in the lake and can hold three hunters. Approximately 20 decoys are furnished, and steel shot is required.

Hunting can also be good outside the refuge on a variety of impoundments and field blinds provided by private outfitters who can offer a package deal that includes lodging, meals, guide and even sometimes a night-before oyster roast.

Even though the Canada geese are largely gone except for a remnant of the southern flock that still seeks out its old stomping grounds, Mattamuskeet retains its charm. Driving through this largely unchanged rural part of eastern North Carolina on a cold winter afternoon, the old excitement is there even if the sky is not filled with honkers. Mattamuskeet works its magic and you don't have to be freezing in a blind at dawn to share it. And some who remember still cling to the hope that someday more geese will return, even though most realize that 100,000 Canadas would be too much to expect even for such an ideal spot. Times have changed at Mattamuskeet over the years, but the day may return when times change at DelMarVa. Already, there are plans to reopen the lodge for duck and small-game hunters who have found out that Mattamuskeet still has much to offer. If indeed the geese ever do come back, it could be just like old times—a blood red sky filled with geese and honking that never seems to end.⊠

***White-tailed deer*** *peer inquisitively from the marsh grass along the lake, and it is not uncommon for waterfowl hunters or photographers to encounter them in and around the national refuge.*

# When The Eagles Fly

## When the eagles (dollars) fly, the real eagles also fly. And that's only the most visible benefit of the tax checkoff for nongame wildlife.

by Mark Taylor

Triangle residents have learned to expect crowds at the B. Everett Jordan Reservoir, but the scene last summer at the N.C. 751 bridge was something special. On any given morning, a horde of people could be found at the bridge scanning the distant waters with binoculars and spotting scopes.

Why all the commotion? Last year — for the first time — large numbers of bald eagles spent the entire summer on the upper portion of the reservoir. The interest in Jordan Lake's eagles was also indicative of the support that Tar Heels had expressed for the North Carolina Nongame and Endangered Wildlife Fund. Through a checkoff on the 1985 state income tax returns, over 32,000 North Carolinians contributed approximately $300,000 to fund nongame and endangered wildlife programs — roughly a 31 percent increase over the previous year.

Here's a rundown on what these funds did for nongame and endangered wildlife in 1985, and a look at what is planned as the program enters its third year.

**Bald Eagles and Peregrine Falcons**

Bald eagles were in the news almost constantly last year as biologists found more of them in North Carolina than they'd ever expected.

"The big surprise was when large numbers of eagles began turning up at Jordan Lake near Raleigh in early summer," said Debbie Paul, chief of the Wildlife Commission's Youth Activities and Environmental Quality Section. This section houses the nongame and endangered wildlife program. "There were 32 eagles using the lake in June, and the number peaked at 42 birds in July. This had never happened before, and makes Jordan Lake one of only four summer roosting areas for eagles on the East Coast — the others are in Maryland and Virginia. We plan to conduct extensive winter and summer surveys of eagle habitat this year. In addition to counting the birds, we'll identify primary-use areas such as roosts. We're also working with landowners and land-management agencies to protect the birds and their habitat."

The bald eagle restoration project entered its third year as 10 birds were released from the Lake Mattamuskeet National Wildlife Refuge in Hyde County. Plans call for 10 to 12 birds to be released from the site for the next four years. The peregrine falcon restoration project entered its second year as 10 birds were released from two sites. Six birds were released from Grandfather Mountain — site of the first release in 1984 — and four birds were released from a new site on Yellow Mountain near Highlands.

"The big news this year was that one of the birds we released in 1984 — nicknamed 'Artie' by the attendants — returned to Grandfather Mountain," said Paul. "We identified him by his leg band, and we're really thrilled about this. Peregrines mature in only two years, so if Artie finds a mate and returns this summer, we could have the first nesting of peregrine falcons in North Carolina since 1958.

"We're also planning to conduct an intensive survey of peregrine nesting habitat in the next year," Paul continued. "Restoration projects for peregrines to the North have gone well, and some of these birds may expand their range into North Carolina."

**Sea Turtles**

Each summer, several remote Outer Banks beaches play host to an ageless drama. Under the light of a full moon, lumbering behemoths emerge from the surf to crawl up the beach, lay a nest of eggs in a hole dug in the sand with their flippers, and return to the sea.

The nesting of loggerhead sea turtles is a sight one never forgets, and much of the management of this threatened species involves the protection of nests.

"We've expanded our monitoring program so that about 80 percent of the nesting habitat for loggerhead sea turtles

Debbie Conger

***Teaching young people** to appreciate nature is accomplished through such educational programs as Project WILD and CLASS Project. John Connors, Raleigh city naturalist, shows an elementary-school class how beavers create habitat that benefits many species of wildlife.*

is routinely surveyed," said Paul. "This monitoring is done by employees of state or federal natural resource agencies or volunteers. There are active volunteer groups at Holden Beach, Long Beach, Caswell Beach and on the Pender County islands and they've been a great help."

When a nest is found, it may be relocated if it is in danger of being lost to beach erosion. "Turtles often nest in areas that are over-washed by high tides, and prolonged exposure to saltwater can kill the eggs," Paul said. "Consequently, these nests may be moved to a higher dune where an identical nest is dug in the sand. If the eggs are relocated within six hours of when they were laid, there is no reduction in hatching success. In areas where predation is a problem, a wire mesh is often placed over the nest. This protects them from raccoons, foxes, dogs and cats which will dig up nests and eat the eggs. The young turtles are still able to crawl through the mesh when they hatch, however."

Paul notes that loggerhead nesting was up about 10 percent last summer compared to 1984, but adds that seasonal fluctuations are common and good nesting years seem to occur on a two-year cycle. One surprise last summer was that several threatened green turtles nested in North Carolina.

"Green turtles are on the very northern edge of their range in North Carolina, and usually nest in Florida or Georgia. However, we had at least two green turtles come ashore and lay five nests on Onslow Beach at Camp Lejeune. One of these turtles had been tagged in the same location in 1982, and this was the first nesting of green turtles we'd seen in two years."

### Other Endangered Species

Several other endangered species projects are planned for the coming year. These

include studies of the Virginia big-eared bat, Tar River spiny mussel, and a symposium on the status of threatened and endangered species in North Carolina.

The Virginia big-eared bat was previously thought to exist only in a few areas of eastern Kentucky, eastern West Virginia, and southwestern Virginia. Recently, however, it was discovered in North Carolina.

"We plan to survey every known cave and old mine in the mountain region for the Virginia big-eared bat," said Paul. "Other bat species will also be inventoried in the process. If the Virginia big-eared bat is discovered at a site, non-intrusive techniques will be used to conduct a population census of the colony. Steps will also be taken to protect the colony."

The Tar River spiny mussel is found only in a 12-mile section of the Tar River in Edgecombe County, and was recently added to the federal endangered species list.

A symposium on the status of threatened and endangered species in North Carolina — as well as species that may be in trouble but are not yet listed — will be held this year in conjunction with the N.C. Museum of Natural History.

"The purpose of this symposium is to target species that are in trouble, and to develop a new threatened and endangered species list for North Carolina," said Paul.

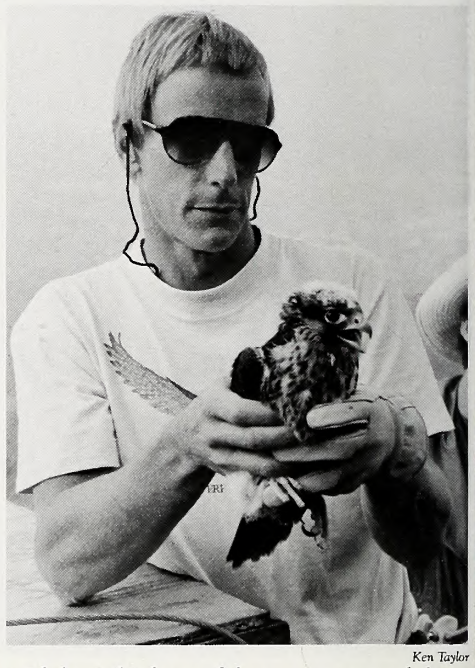
### Colonial Waterbirds

The North Carolina coast is graced by 23 species of shorebirds — pelicans, herons, egrets, terns, gulls and skimmers — that nest in groups on small islands in our sounds and along the barrier beaches. While these birds are not endangered there is concern about their vulnerability to coastal development. Consequently, Dr. James Parnell, a noted authority on shorebirds at the University of North Carolina at Wilmington, recently completed a management plan for colonial shorebirds for the nongame program.

This plan details the population status and nesting sites for each of the 23 species, and also outlines management steps needed to maintain their populations.

"Many of these nesting sites are on low spoil islands in our sounds created by dredging," said Paul. "These islands are under the jurisdiction of the U.S. Army Corps of Engineers. We're working with the Corps to protect and manage these islands. Some birds need bare beach for nesting while others prefer vegetation. This vegetation can be managed by adding spoil or allowing the vegetation to grow. We're also developing cooperative management plans with other agencies and organizations — including the National Park Service and National Audubon Society — to protect these nesting areas."

Leonard Lee Rue, III



Ken Taylor

***Bald eagles*** *(above) were in the news a lot last year. Ten eagles were released as part of a restoration project at the Lake Mattamuskeet National Wildlife Refuge in Hyde County. A restoration project for endangered peregrine falcons (right) entered its second year in 1985. Jack Barclay, a reintroduction specialist with The Peregrine Fund, releases a young falcon at Grandfather Mountain.*

### Education Programs

Instilling a conservation ethic in young people is one of the goals of the nongame program, and this is being done through two conservation-education programs — Project WILD and CLASS Project. Teachers throughout the state are being introduced to these programs through free workshops conducted by the Wildlife Commission's Division of Conservation Education.

"We average about one teacher workshop a week now," said Rick Estes, field section coordinator for the Division of Conservation Education. "Each teacher has about 100 students per class, and we have a minimum of 30 teachers at each workshop. So, this material is reaching many thousands of kids each year. The teachers like this material and use it because it works — it can be easily and quickly incorporated into their subject areas."

A North Carolina supplement to Project WILD is being prepared by John Alderman, Piedmont project leader for the nongame program.

"This supplement will deal with aquatic resources such as lakes, rivers, streams, salt marshes, estuaries and other marine ecosystems," he said. "The activities will deal with basic biology of these systems and the issues of urban and farm runoff, hazardous and toxic wastes, and siltation. We're trying to build a greater appreciation for our waters and wetlands. This material should be available within two years."

Several other education programs have also been expanded. The *Carolina Notebook*, a free environmental education primer published six times a year, is now mailed to nearly 7,000 teachers. Special teacher workshops focusing on science, technology and social issues have been held in cooperation with Duke Power Company. Also, week-long teacher workshops dealing with all aspects of natural resources and conservation are held each summer at state forests across North Carolina.

Jack Dermid

***Spoil islands*** *created by dredging furnish valuable breeding habitat for colonial nesting waterbirds such as these egrets at Battery Island.*

Ken Taylor

***Threatened loggerhead sea turtles*** *still nest on the Outer Banks. Beaches are monitored by agencies and volunteers during the nesting season.*

**Roanoke River Bottomlands**

The best thing to happen for North Carolina wildlife this year was the acquisition of four key tracts of bottomland hardwood forests along the Roanoke River in Bertie and Halifax counties, funded partially by the Nongame and Endangered Wildlife Fund. These tracts total over 5,400 acres, and plans are underway to secure a fifth tract which would add 3,700 acres. The lands were acquired by the North Carolina Nature Conservancy from True Temper Tools, a subsidiary of Allegheny International Corporation. In turn, the Nature Conservancy sold four of the tracts to the state.

"These tracts are the best bottomland hardwood forests left in North Carolina, and are among the best in the Southeast," said Paul. "Timber cutting has been limited because True Temper selectively cut mostly green ash for tool handles. Consequently, the tracts are covered with huge cypress, gums, oaks, hickories and other hardwoods. These bottomland hardwood forests have tremendous values for wildlife."

The Nature Conservancy had originally bought the land from Allegheny International for $4,300,000. The North Carolina General Assembly appropriated $1.4 million for the purchase and another $500,000 came from a mitigation bank of the N.C. Department of Transportation. This mitigation bank was established to help offset unavoidable losses of bottomland hardwood forests to road and bridge construction. The Wildlife Commission's share of the purchase was $744,000. Of this total, $50,000 was appropriated from the Nongame and Endangered Wildlife Fund, $186,000 from the waterfowl fund which is supported by the sale of state waterfowl conservation stamps and art prints, and the remainder from sales tax revenues returned to the Commission by the Hardison bill.

"Our current management plan for these sites emphasizes habitat protection," said Paul." In the next five years, nature trails and observation and photography blinds will be developed so people can enjoy these swamps. The important thing, though, is that the lands were saved. Most of our bottomland hardwood forests have been lost, and we saved these literally just before the bulldozers began to roll."

**How To Contribute**

To help support the nongame and endangered species programs, take a close look at the instructions for your 1985 North Carolina tax form. On page 3 are instructions on how to contribute to the North Carolina Nongame and Endangered Wildlife Fund. If you wish to support this fund, enter a donation from your refund on line 23 of the tax form. This donation will not increase the tax you pay, and may be deducted from your income on the following year's tax form. If your tax returns are prepared professionally, tell your accountant that you wish to contribute to the Nongame and Endangered Wildlife Fund. If you aren't receiving a refund — but wish to support this program — tax-deductible contributions may be sent to the N.C. Nongame and Endangered Wildlife Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.

# A

*A century before Audubon, Mark Catesby*

# COLONIAL

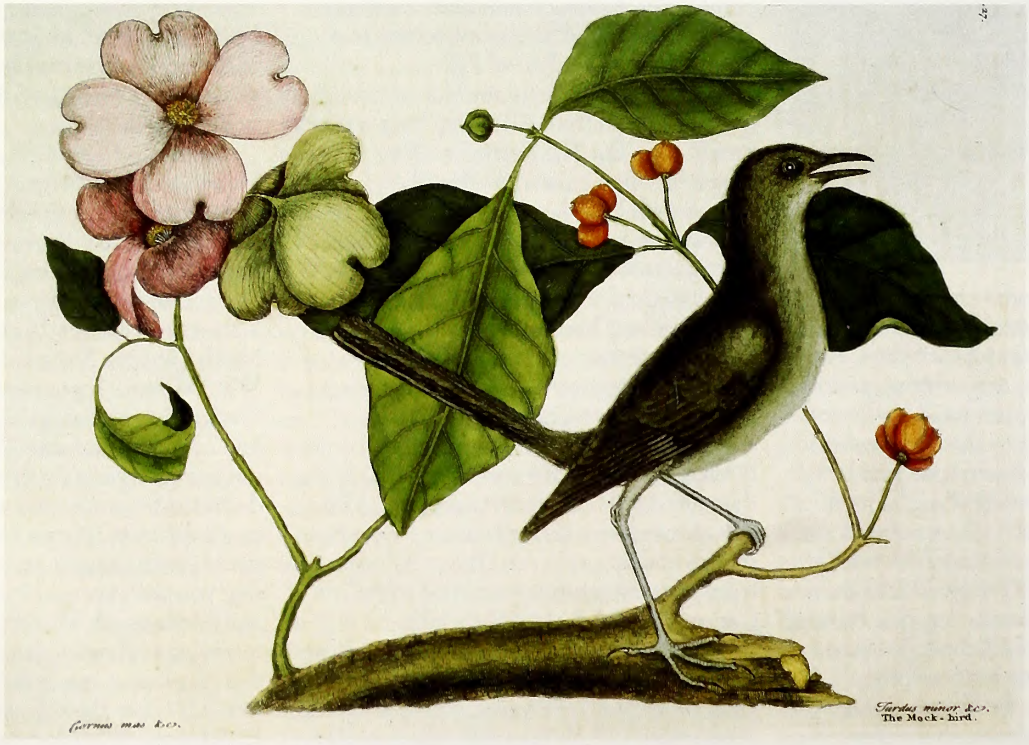
*traveled widely in the Carolinas*

# BIRD

*and painted scenes of its teeming birdlife.*

# LOVER

*by Alan Feduccia*




THE MOCK-BIRD

The impact of John James Audubon's *Birds of America* (1827-1838) was so great that all who came before and most who came after were overshadowed and obscured. This is nowhere more true than in the case of Mark Catesby, the first to draw an extensive array of the plants and animals of America. Catesby was quite well-known in the 18th century in both America and Europe, and his *Natural History of Carolina, Florida, and the Bahama Islands, 1731-43* was truly a pioneering work in the field of scientific illustration. In fact, it remained until the time of Audubon, a century later, the best illustrative treatment of the flora and fauna of North America.

Catesby (1682-1749) was born and educated in England, and from his early years had a keen interest in natural history. His sister Elizabeth's move to Virginia made it possible for Mark to venture to America, and she thus played a crucial role in Catesby's becoming a colonial naturalist. Catesby sailed for the New World in 1712 and returned to England in 1719. He spent most of his first stay in America in Virginia, becoming an acquaintance of William Byrd II and other well-known men in Virginian society. His close friendship with Byrd brought Catesby into contact with the flora and fauna of Virginia and exposed him to many remote regions and their native inhabitants, the Indians. During this time Catesby apparently was primarily concerned with collecting plants, and he sent many specimens back to England.

In spite of Catesby's great talents as a naturalist and his impeccable contacts, it was only a colonial tragedy that gave him the chance to document New World flora and fauna. John Lawson, the great American natural historian who preceded Catesby (See "Lawson's Long Trail," *Wildlife in North Carolina*, Dec. 1982), had agreed in 1710 to compile a complete natural history of America. Unfortunately, Lawson's untimely death at the hands of the Tuscarora Indians in 1711 prevented his undertaking this project. Members of the intimate circle of London natural historians were able to convince Catesby to take on the task that Lawson had left. Catesby arrived in Charles Town (modern day Charleston) South Carolina in May 1722. He spent about three years in the Carolinas, making trips into the Piedmont, into parts of Florida, including the area of present-day Georgia, and to Fort Moore, a frontier garrison located on the Carolina side of the Savannah River opposite the present-day site of Augusta.

Catesby returned to England in 1726, and by the spring of 1729 he had completed the first part of his *Natural History*. The writing, the illustrating and the printing of his two-volume book would consume some 20 years.

When finished in 1747, Catesby's *Natural History of Carolina, Florida, and The Bahama Islands* included 220 plates, illustrating 109 birds, 33 amphibians and reptiles, 46 fishes, 31 insects, 9 quadrupeds, and 171 plants. The text contained descriptions of the geography of the regions, including the climate, soil, and agriculture and a rather lengthy essay on the Indians, a section Catesby admits he owes much to John Lawson. Lawson's *New Voyage to Carolina* (1709) was the first major attempt at a natural history of the New World and was so popular that it went through three English and two German editions between 1709 and 1722. His book was widely read and widely plagiarized. Although Catesby does not seem to have copied any of Lawson's sections directly, Catesby's entire text is quite similar in both format and content to that of Lawson, even in many of his accounts of birds, fishes and mammals.

Although Lawson had completed the first detailed ornithology for the New World 20 years before the publication of Catesby's first volume, Catesby was without doubt the real founder of American ornithology. Lawson's work had very little impact in the long run, for people in Europe wanted to see vivid illustrations of the supposedly lavish and brightly colored birds, as well as the other fauna and flora, of the strange new continent. And it was Catesby who for the first time provided such a treatment.

Cateby's *Natural History* was a remarkable achievement. His art is of the primitive type, but the drawings are nonetheless lively portrayals of North American flora and fauna and, for the first time also he combined animals and plants in a meaningful manner on the same plates. Catesby was quite emphatic in stating that the animals and plants he depicted together had some true-life association, but this is not always the case. A number of plates exhibit animals and plants that would never occur together in nature.

There were other colonial naturalists who dealt with American birds, but it was Lawson and Catesby who first put the natural history of the New World in its proper perspective and were able meaningfully to document the fauna and flora. Indeed, after Lawson and Catesby it was not until the publication of William Bartram's *Travels Through North and South Carolina... in 1701* that the study was advanced appreciably.

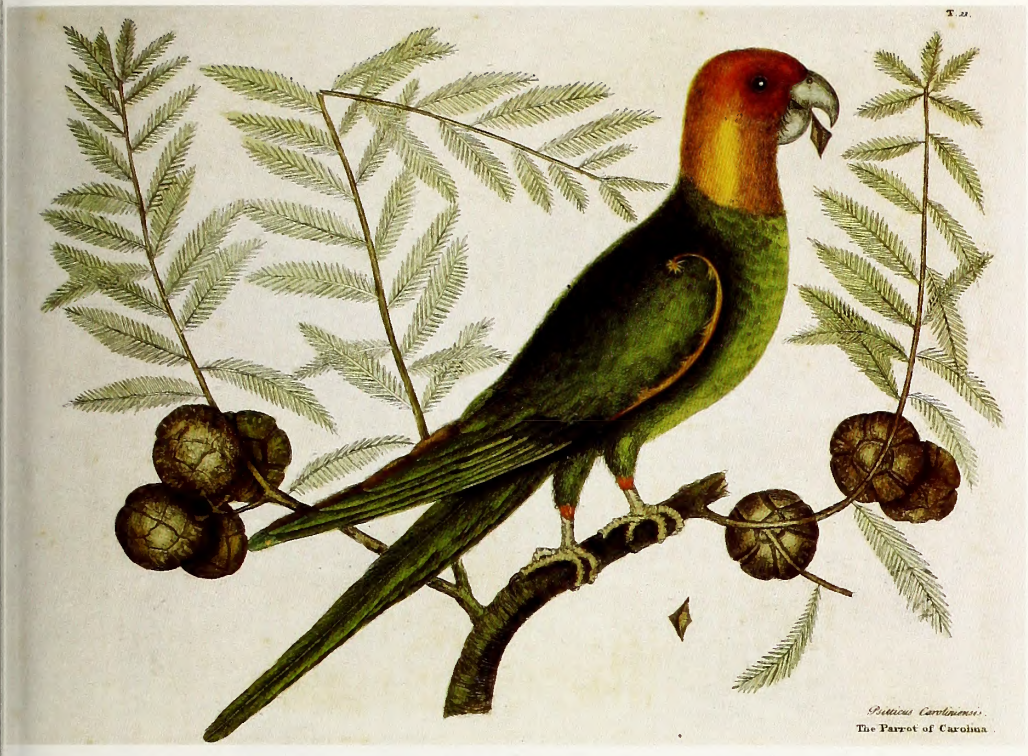
THE MOCK-BIRD

This bird is about as big or rather less than a blackbird, and of a slender make. Hernandez justly calls it the queen of all singing birds. The Indians, by way of eminence or admiration call it *cencontlatolly*, or four hundred tongues; and we call it (though not by so elevated a name, yet very properly) the mock-bird, from its wonderful mocking and imitating the notes of all birds, from the hummingbird to the eagle. From March till August it sings incessantly day and night with the greatest variety of notes; and, to complete his compositions, borrows from the whole choir, and repeats to them their own tunes with such artful melody, that it is equally pleasing and surprising.

*Catesby's "mock-bird" is pictured with the flowering dogwood (*Cornus florida*). Catesby painted the pink form of the dogwood (forma* rubra*), of which he was quite fond.*

Portions adapted from *Catesby's Birds of Colonial America*, edited by Alan Feduccia. Copyright 1985 The University of North Carolina Press. Reprinted with permission of the publisher. (Available in bookstores or from The University of North Carolina Press, P.O. Box 2288, Chapel Hill, NC 27514. $29.95.)

THE BLUE HERON




THE PARROT OF THE CAROLINAS

THE PURPLE MARTIN

THE BLUE HERON

This bird weighs fifteen ounces, and in size is somewhat less than a crow. From the breast hang long narrow feathers, as there do likewise from the hind-part of the head; and likewise on the back are such like feathers, which are a foot in length, and extend four inches below the tail, which is a little shorter than the wings. These birds are not numerous in Carolina; and are rarely seen but in the spring of the year. Whence they come, and where they breed, is to me unknown.

*Catesby's "blue heron" is an adult little blue heron in full nuptial plumage.*

THE PARROT OF CAROLINA

They feed on seeds and kernels of fruit; particularly those of cypress and apples. The orchards in autumn are visited by numerous flights of them; where they make great destruction for their kernels only; for the same purpose they frequent Virginia; which is the furthest north I ever heard they have been seen. Their guts are certain and speedy poison to cats. This is the only one of the parrot kind in Carolina; some of them breed in the country; but most of them retire more South.

*Now completely extinct, the Carolina parakeet was the only endemic parrot of North America; it was common along the Atlantic coastal plain from Florida to southern Virginia (and occasionally northward to New York), and west to Texas, Oklahoma, and Colorado and northward to Iowa and Wisconsin. Catesby's "parrot of Carolina" is pictured feeding on one of its favorite trees, the baldcypress (*Taxodium distichum.*)*

THE PURPLE MARTIN

Is larger than our common martin. The whole bird is of a dark shining purple; the wings and tail being more dusky and inclining to brown. They breed like pigeons in lockers prepared for them against the houses, and gourds hung on poles for them to build in; they being of great use about houses and yards, for pursuing and chasing away crows, hawks, and other vermin, from the poultry. They retire at the approach of winter, and return in the spring to Virginia and Carolina.

*Catesby's purple martin is illustrated with coral beads or moon seed (*Cocculus carolinus*), a climbing vine; in September, when they ripen, the fruits resemble whitish-powdered grapes.*

THE WHITE CURLEW

This is about the size of a tame pigeon. The bill is six inches and a half long, of a pale red color, channeled from the base to the point; the iris of the eyes are gray; the fore part of the head, and round the eyes, is covered with a light red skin; four of the largest wing feathers have their ends dark green; all the rest of the bird is white, except the legs and feet, which are pale red. The flesh, particularly the fat, is very yellow, of a saffron color. When the great rains fall, which is usual at the latter end of summer, these birds arrive in Carolina in great numbers, and frequent the low watery lands. The cock and hen are alike in appearance.

*Catesby pictured his white curlew, a mature white ibis, with the golden club* (Orontium aquaticum), *a beautiful perennial of southern swamps.*

THE PAINTED FINCH

This weighs nine penny-weight, and is about the bigness of a canary bird. Though a particular description may be required, in order to give the more perfect idea of this bird, yet its colors may be comprised in three; the head and neck are blue; the belly red, and the back green. Its notes are soft; but have not much variety. They breed in Carolina, and affect much to make their nests in orange trees. They do not continue there in winter; nor do they frequent the upper parts of the country. I never saw one fifty miles from the sea. Though the cock is so elegant, the hen is as remarkable for her plain color, which is not unlike that of a hen-sparrow, but with a faint tincture of green. The Spaniards call this bird *mariposa pintada*, or the painted butterfly.

*Catesby's nonpareil is pictured in the loblolly-bay* (Gordonia lasianthus), *the bark of which was used locally for tanning.*

THE WHITE CURLEW

Caption information written by Mark Catesby. Italicized text by Alan Feduccia.

THE PAINTED FINCH

# *Sleuths of Our* NATURAL HERITAGE

The future of many unique natural areas in North Carolina is in the hands of a small, but determined, group of government employees who take their jobs very seriously.

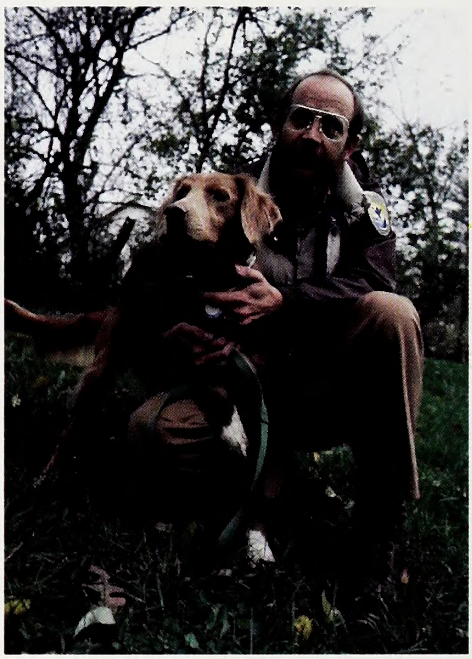
by Lawrence S. Earley

Henderson County is tricky in late October. A front blows up the mountains on a pleasant morning and suddenly fog is creeping into the valleys and coves and a steady, cold rain makes you wonder whether that half cord will last the winter. On one such day, a group of men and women stood together in a little woods between a dirt road and a cleared field. They were gazing at a hint of an evergreen plant that sat about 4 inches high in a bog.

What they were looking at was the bunched arrowhead (*Sagittaria fasciculata*), one of the rarest plants in North Carolina and the first plant in North Carolina to be listed as a federally endangered species. They might well have called it a needle in the haystack. The plant's discovery in this Henderson County sphagnum bog more than a year before had set off rejoicing in the botanical community. But what had brought this group together was not the urge to look, but the need to talk to the landowner about the conservation options he had. And Julie Moore of the North Carolina Natural Heritage Program was doing this even as the rain pelted down. With the landowner's consent, there was a chance that the plant might be saved.

Indeed, finding and saving rare plants and habitats is the goal of a network of dedicated botanists across the state, and their efforts are helping to deepen our knowledge of North Carolina's rich natural heritage. These botanists belong to a variety of state and federal agencies, to college and university staffs. Also figuring prominently are those who might be called "amateurs," although only in the true sense of the term — one who pursues his object as a pastime rather than as a profession.

Call them botanical sleuths — their exploits sound like something out of detective fiction. Like detectives, these naturalists do their homework, follow leads, act on hunches and hope for the lucky accident. Like detectives, they do most of their work outside — slogging through sphagnum bogs, for example, or crawling mountain cliffs to examine a particular rock outcrop.



Jay Davies

***Botanist Bob Currie** and his dog Buffy found a new population of the endangered bunched arrowhead.*

Like detectives, too, these botanists are all too aware that time is against them. It's what gives them their edge. Says Chuck Roe, director of the state's Natural Heritage Program: "More than most state employees, we have a sense of urgency and mission that drives us. We see what's leaving the landscape and how fast it's going."

Perhaps the least complicated type of plant detective work is relocating old sites of plants. This may take the form of studying historical records such as old books, letters or journals of naturalists who visited a certain area in the past. Or, more often, it involves studying a collection of dried plants in a herbarium. Herbaria are like libraries of plants. Over the years, collectors deposit their finds in these libraries and tag them with cards that tell where the plant was found and when. These records give the naturalist a starting point for his searches, although sometimes the site description may not help much. A direction "5 miles s.e. of town" written in 1893 may well give only the slimmest of leads to hang a search on.

Rob Sutter, a botanist with the N.C. Department of Agriculture's Plant Conservation Program, tells of one search he made for the rare orchid *Arethusa bulbosa*, the bog rose. From studying herbaria and other records, Sutter found that there were three locations of this mountain plant, one near Brevard, another on Cedar Mountain and the third, collected nearly 100 years ago, along a certain road in Transylvania County. The chances of the same road being there after 100 years of mountain development were slim, but Sutter studied a topographical map for clues.

"From the habitat requirements of the plant, I guessed where the road would be and found just a trace of a trail marked on the topo map," he says. "I went to the area and found names that were like the ones on the herbarium description, so I knew I was in the right area. I went from house to house and finally ran into a local naturalist who said, 'Yeah, so and so has a real rare orchid on his property.' I went to the house and sure enough it was near the road on the map and sure enough he had the bog rose growing in his yard."

Relocations like this one are only starting points for true sleuthing. Searches for old locations can teach the naturalist about the habitat the plant grows in, but then it's time to apply what he's learned. Julie Moore says,

Lawrence S. Earley

**A mountain species**, *the bunched arrowhead* (Sagittaria fasciculata), *below, is found in southern Appalachian bogs. Like the plant, this habitat (left) has become endangered by mountain development. Growing in only a few locations in North and South Carolina, the bunched arrowhead was the first plant in the state named to the federal list of endangered species.*

Lawrence S. Earley

***Natural Heritage Program*** *botanists Laura Mansberg and Julie Moore (left and right) discuss a find during a recent search. Heritage Program staff members work closely with botanists and biologists throughout the state to identify unique natural areas. Their recommendations guide the N.C. Nature Conservancy in its efforts to acquire significant but endangered habitats.*

"Just following someone else's clues, that's fun and it's important, but the point is to take what you find from that site and then go someplace else."

A good example of this kind of detective work is the search for the bunched arrowhead. There were a total of 12 herbarium records of the plant in North Carolina, dating as far back as 1887. All but one of them had come from an area ranging from Flat Rock to Hendersonville. It became quite clear in the 1960s and early '70s, however, that most of the locations described in the records no longer existed. *Sagittaria fasciculata* grows in rare habitat known as a Southern Appalachian bog. Such wet, poorly drained and fertile areas had been gradually converted to agriculture and pasture through the years. By the '70s, many botanists had grown alarmed at the destruction of the plant's habitat. Only one small population had been found, in a bog that had been nearly destroyed by a highway and railroad tracks.

Because of its rarity and the fragility of its habitat, the bunched arrowhead was named in 1979 as North Carolina's first federally endangered plant species. Not long after that, Rob Sutter drew up a recovery plan that among other things directed further searches to be carried out to determine the status of the endangered plant.

How do you look for a plant in an area as large as a county? Well, you start with what you know. That was what Bob Currie did when he began his search in 1983. Currie is a botanist with the U.S. Fish and Wildlife Service, Office of Endangered Species. He had been in contact with a South Carolina botanist, Doug Raynor, who worked with the natural heritage program in that state. Raynor had found in his own researches that the bunched arrowhead seemed to be associated with a certain type of soil, and that it preferred locations at the bases of slopes where cool water constantly flowed. Currie started with this information.

N.C. Plant Protection Program

***The bog rose*** *(*Arethusa bulbosa*), above, is a rare plant found in only a few mountain locations.*

"Two years ago in January 1984," he says, "I started spending an hour or two at night transcribing the soils of the type we were looking for to topographic maps. Unfortuately the soils maps were at a slightly different scale than the topo maps—1:20,000 against 1:24,000—so I had to change the scale, which is frustrating. I did this for a month off and on. When a location had a good combination of soil and slope I put an X on that area."

Starting that winter, Currie, Rob Sutter and Nora Murdock, also with the U.S. Fish and Wildlife Service, began to examine the boggy areas marked on Currie's map, working outward from the one known location near the railroad tracks. On Saturday, April 21, Currie and his dog Buffy were searching the margin of a flood plain. The soil wasn't quite right, he knew, and yet he had a hunch: The slope looked too good to be true. His hunch was a good one. As his dog ran into the woods, up to her shoulders in the muck, she ran right through the middle of the *Sagittaria*. Currie was restrained when he wrote Rob Sutter early the next week. "Great news! Last Saturday, I found a new population of *Sagittaria fasciculata* in North Carolina." He didn't tell Sutter that he had bellowed like a banshee when he saw the plant.

Finding rare plants and habitats can sometimes occur when you're not expecting it. That's the reason why so many botanists seem to describe their experiences in terms verging on the mystical. They talk about "daring to believe" that they can find a rare plant, of putting themselves into the right frame of mind. One botanist even dreams about the rare plants he'd like to find.

Julie Moore accidentally found a reportedly rare plant one day when she was looking for something else. She had been at a meeting and had heard a paper given on the bog spicebush *Lindera subcoriacea*. According to the botanist, the shrub was found in only one Louisiana parish and three or four counties in Mississippi. She read up on the plant out of sheer interest, partly because a related plant, the common spicebush (*Lindera benzoin*), was a North Carolina species. Then, in February 1984, she was investigating an area at Fort Bragg that she knew well.

"I've worked that type of habitat regularly," she says, "and I know just about

***The mountain pitcher plant*** *(*Sarracenia jonesei*) is a rare plant found in boggy habitat.*

all the plants there. As I was crossing a particularly wet area, I grabbed ahold of a shrub to keep from falling in a creek. All of a sudden I was picking up a different sensation. I looked at this shrub and knew it didn't belong where it was. It was like neon lights going on."

What she had found was the *Lindera subcoriacea*, the plant she had been reading about. Here it was nearly 500 miles away from Mississippi, making it an extreme northern disjunct. She notified the scholar who had made the presentation and he was flabbergasted. There were no herbarium records for the shrub in North Carolina. Moore wondered if the plant had been collected but been mislabeled as the more common *benzoin*. She checked the herbaria again and found three *subcoriacea* plants misidentified as *benzoin*, two from North Carolina and one from Georgia. In September she went to Georgia to aid in the search for the plant there and found it.

"It's not like this plant just popped up," she explains. "It was collected in North Carolina in 1907, and in Georgia in 1911. It's just taken those 80 years to get it brought to the attention of botanists." It's still an interesting plant, but far more common than was once thought and that's useful to know. As Moore says, "You don't sell your case very well if people go out and find 18 million locations for a plant that's supposedly rare."

Botanists may dream about the rare plants they want to find, but perhaps the ultimate experience is to find a virgin habitat, a place where no botanist has ever set foot. Dreams like these have historically driven naturalists to all parts of the globe, wherever there was an empty space. In North Carolina, men like Andre Michaux, William Bartram and other early botanists wandered through the Garden-of-Eden wilderness naming new plants. Experiences like these are hard to come by these days, although similar ones are not impossible.

Alan Weakley, a Natural Heritage Program ecologist, found a rare natural area near Lanier Quarry in Pender County. The Quarry has been an important fossil-collecting area for many years, and while collecting fossils one day in 1975 with his University of North Carolina geology class, Weakley noticed that there was an interesting long leaf pine savannah nearby. It was an open savannah, the result of frequent burning. He tucked the area away in his mind.

Then in 1980, Weakley was contracted by the Heritage Program to do a natural areas survey of New Hanover, Pender and Onslow counties. One of the areas he decided to look at was Lanier Quarry.

***The purple pitcher plant*** *(Sarracenia purpurea) is common in the Coastal Plain, but rare in the mountains.*

Lawrence S. Earley

***Natural Heritage Program*** *ecologist Alan Weakley and botanist Craig Moretz talk to landowner about his important natural area. Conservation agreements with landowners can secure significant habitats and protect their endangered or rare botanical treasures. Besides development, botanists must contend with plant poachers who can strip natural areas of their rare plants.*

"Part of the reason I was interested in Lanier Quarry," he says, "was that it was a savannah over marl, over limestone. Limestone weathers to produce a high-nutrient condition, generally speaking. It's good for growing plants. But savannahs as a type are famous for being nutrient poor." They typically have the acidic soils with few nutrients that support the nation's major populations of insectivorous plants. "So this struck me as possibly being a different kind of savannah.

"I visited the area several times in 1980 and found a number of rare plants, including the Carolina grass-of-parnassus (*Parnassia caroliana*), the short-leafed yellow-eyed grass (*Xyris brevifolia*), and others. I decided that it was a significant natural area, one of the 10 significant natural areas in the three-county area."

Another botanist, Steve Leonard, did more detailed field work at the Lanier Quarry Savannah after Weakley and discovered probably the most important find to date, Cooley's Meadowrue (*Thalictrum Cooleyi*), which grows only in North Carolina and is extremely rare. "It seems that every year we do work there we find something else," Weakley says. "It's really a stepping-stone matter — you find out certain things and that spurs further interest and other people look at it a little bit more and they find yet other interesting features." The North Carolina Nature Conservancy is currently working to acquire the unique habitat and its treasure chest of rare plants.

Certainly there is a lot of ego involved in botanical detective work. Finding a rare species or a unique plant community is as close to signing a work of art as you can get in the botanical business. Forever after it's got your name attached, at least by word of mouth. And yet there's more to it than that. Alan Weakley: "Equally important for most people is that they like to understand what's out there. When you find something interesting, whether it be a rare thing, or something not seen before, you get a real sense of satisfaction from another chink of the whole thing fitting. It's not only finding a new species for the state, but understanding its habitat, understanding what it grows with, the kind of soil conditions it prefers, what rock type it occurs over, and so forth."

And, of course, finding the rare plants and habitats is only the first step, for the whole point of the exercise is not just to count up the state's botanical treasures like so many add-a-beads, but to preserve them for tomorrow and the day after. Which was why Julie Moore and the others were standing out there on that wet October day explaining what the bunched arrowhead was, and why it was important to North Carolina. The detective work had been done: the deductions and hunches and accidents had resulted in this moment on a raw day in October when a landowner's decision lay in the balance.

Of course, with this landowner they were past the shotgun stage. He at least was interested in listening. He might still shake his head to the options that Julie outlined: a permanent conservation easement that would preserve the land in perpetuity, or a less permanent listing on the state's registry of natural areas. But that's not what he did.

"You know, I was going to develop this lot in another 12 months," he said. "I was going to divert the drainage and clear the land and put in some houses. Lots around here get $30,000 or $40,000 apiece, but I sure don't want to destroy an endangered species."

Today, he's trying to find a way to save the bog without losing all of his development opportunities. Sometimes detective stories have happy endings. ⊠

*Application Deadline Now March 1*

## Wildlife Seed Program Overhauled

*Written and Edited by Mark Taylor*

There'll be some changes in the Wildlife Commission's wildlife planting materials program this spring. Landowners and sportsmen who wish to receive planting materials from the N.C. Wildlife Resources Commission should mark March 1 on their calendars. Applications for seed must be submitted to district wildlife biologists prior to this date.

"We recently completed an evaluation of the wildlife planting materials program," said Terry Sharpe, small game project leader for the N.C. Wildlife Resources Commission. "This program began in the late 1940s, and has always been very popular. Although the evaluation disclosed some problems, the survey also showed that the majority of cooperators were conscientious in planting and caring for their wildlife food plots. We found that 73 percent of the units of annual seed mix planted resulted in successful food plots. However, the success rate for the perennial mixture was only 30 percent."

Cooperator interviews also showed that most participants in the program wished to improve hunting on their lands. A total of 62 percent of the cooperators wished to benefit quail, and 14 percent wished to benefit rabbits. While the planting materials are designed primarily for small game, 49 percent of the cooperators also wished to benefit deer.

"Changes are being made in application deadlines and delivery dates to improve the success rate of the perennial seed mix," said Sharpe. "The primary species in the perennial mix—shrub lespedeza and partridge pea—both perform best when planted early. The poor results we've noted with this seed mix have probably been caused by late delivery and planting. Consequently, we've moved the application deadline back, and seed should be delivered to cooperators by April 1. The sooner this seed mix is planted, the better."

Sharpe adds that planting wildlife food plots is only one part of a well-rounded management program for small game.

"Landowners must consider the year-round needs of quail and rabbits to successfully manage these species," he said. "Food plots are designed solely to provide a fall and winter food source. Quail and rabbits also need escape cover and areas to nest and brood their young. In general, wildlife food plots will be more beneficial if they are planted near the following habitats: dense brush that provides escape cover, 1-2 year-old weeds that provide nesting cover, and fruit-producing shrubs such as blackberries, wild plums, or grape vines. We also urge anyone who is interested in learning more about managing wildlife on their land to contact their district wildlife biologist."

Application forms for wildlife seed mixes are available from district wildlife biologists or county offices of the U.S. Soil Conservation Service. For the name of the district wildlife biologist in your area, contact the Wildlife Commission's toll-free, 24-hour Wildlife Watch Hotline at 1-800-662-7137.

Jack Dermid

***Planting Quail:*** *The wildlife seed program is designed to benefit quail and rabbits, and changes are being made in the program to make it more effective.*

*Contribute To The Nongame Tax Checkoff*

## Support Your Local Egret

Joel Arrington

***Build Them A Future:*** *American egrets and many other shorebirds will benefit from management plans for colonial nesting shorebirds developed under the auspices of the Wildlife Commission's nongame and endangered species program. Other projects include the restoration of endangered bald eagles and peregrine falcons, management of threatened loggerhead sea turtles, and the introduction of conservation-education programs into the state's schools.*

*You can help support this work by contributing to the checkoff for the Nongame and Endangered Wildlife Fund on your 1985 North Carolina Income Tax return.*

## Bluebirds Can Be Fed All Year

A bluebird is a beautiful sight, and you can often keep these birds nearby year-round by providing them with special feed and a feeder.

The recipe for the feed consists of one part flour to three parts yellow corn meal. Use lard (not shortening) to bind the mix together, and add peanut butter or peanut hearts (which are cheaper).

Pack this mixture into 1½ inch holes drilled into a short length of log, and hang it from a tree limb.

Do not add regular bird seed to the mix because insect-eating birds generally don't care for it. This mix will also attract woodpeckers, cardinals, nuthatches, mockingbirds and many other songbirds.

*Fish Reduce Disease Risk*

## Eating Fish Is Heart's Delight

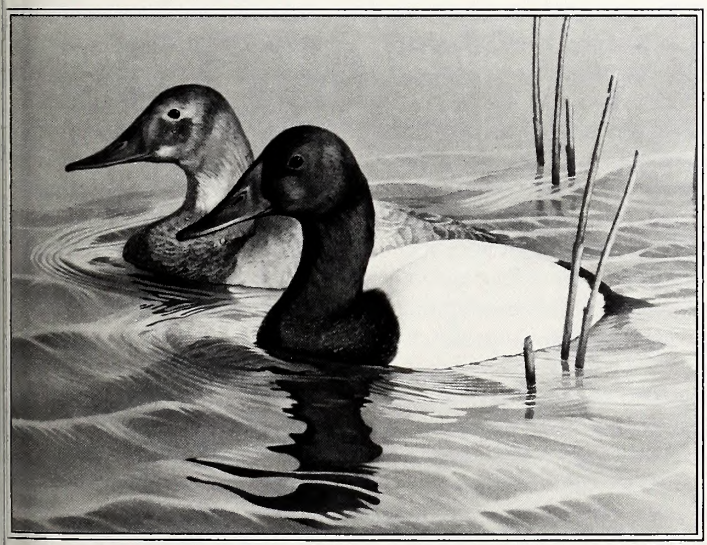
Any angler will tell you that fishing is good for the soul. Now, there's evidence that eating your catch is also good for the body.

A recent article in the *New England Journal of Medicine* notes that eating fish regularly may reduce the risk of heart disease considerably. Dr. Dean Kromhout and his colleagues at the University of Leiden in the Netherlands monitored the health and fish consumption of 852 middle-aged Dutch men over a 20-year period. They found that mortality from coronary heart disease was over 50 percent lower among subjects who consumed an average of an ounce of fish daily compared to those who never ate fish. While researchers were unable to explain the link between fish and better health, they speculated that fish oil may cause blood to clot more slowly and reduce fat levels in fish and man.

The researchers recommend that people include fish in their diets once or twice a week — adding that heart disease is also rare among the Eskimos and Japanese, who eat large amounts of fish.

*Helps Buy Roanoke Bottomlands*

## State Duck Stamp Saves Wetlands



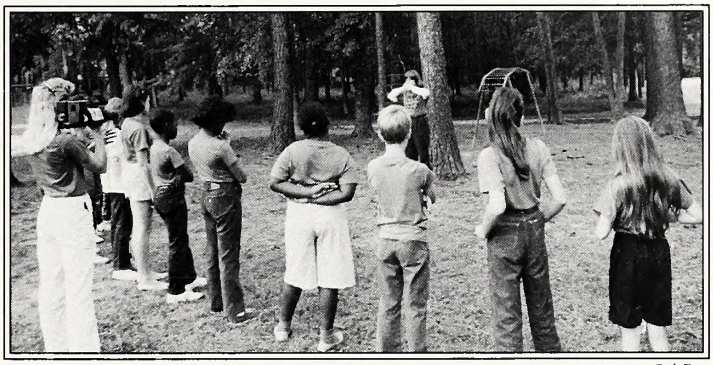
Ken Taylor

***Doing Good Work:*** *The Wildlife Commission recently appropriated $186,000 from the North Carolina Waterfowl Conservation stamp and print program to purchase several key tracts of bottomland hardwood forests along the Roanoke River. These areas offer some of the best wintering habitat for black ducks along the East Coast, and are also prime nesting areas for resident wood ducks. Biologists estimate that 20,000 to 30,000 black ducks and mallards winter in the Roanoke River drainage.*

*Although the deadline for ordering art prints of the 1985 North Carolina Waterfowl Conservation stamp has passed, stamps may still be purchased for $5.50 each from license agents or from the License Section, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.*

*Kids Learn About Wildlife*

## Bugg Students Go WILD



Rick Estes

***A Learning Experience:*** *Over 500 students at Bugg Elementary School in Raleigh learned about wildlife recently by participating in a WILD day.*

Over 500 students went WILD one day last fall at Raleigh's Bugg Elementary School, and it was all planned by their teachers. The school's entire faculty devoted a full day to teaching their students about wildlife and their environment using activities from Project WILD. Kindegarten classes built wild and domestic animal habitats, fourth graders learned about camouflage through the "thicket game," and fifth graders simulated the population dynamics of a deer herd by playing "Oh Deer!"

In all, 17 outdoor and classroom activities dealing with wildlife were used to teach math, social studies, language arts, and science classes. The activities were taken from the Project WILD elementary teacher's guide.

"The purpose of holding a WILD Day was to focus attention on Project WILD materials, and to generate additional interest on the part of other teachers and schools," said Manley Midgett, Wake County science chairman. Three Project WILD workshops have been held in Wake County, and over 50 have been offered statewide. Elementary and secondary teachers' guides to Project WILD are available only through workshops. However, the workshops and teaching materials are free.

The faculty at the Bugg Elementary School was also enthusiastic about the program.

"WILD Day was a great success," said Sally Bragg, principal at Bugg Elementary School. "The teachers and students were very excited, and some real learning took place."

Gloria Pulley, a special science teacher who attended a Project WILD workshop last year, helped other teachers select and learn the activities.

"Everyone was enthusiastic about this event, and they all learned that Project WILD can be a great help in teaching all kinds of classes," she said. "We're already talking about holding another WILD Day this spring, and we'll also be using some WILD activities throughout the year."

Teachers and others who want more information on Project WILD workshops and other educational programs should contact the Division of Conservation Education, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.

*— Rick Estes*

*Twenty-Three Deer Taken*

## First Commission Youth Deer Hunt A Success

Terry Shankle

***Bringing Home The Venison:*** *Melissa Tanner of Dallas — accompanied by her father, Russell Tanner — bagged this 6-point buck at the Wildlife Commission's first youth deer hunt at the Cowan's Ford Waterfowl Refuge.*

Twenty-three young Tar Heel hunters put venison in the freezer following the first youth deer hunt held recently at the Cowan's Ford Waterfowl Refuge in northern Mecklenburg County. The youth deer hunt was conducted by the Division of Wildlife Management and the Youth Activities and Environmental Quality Section of the Wildlife Commission.

"We were very pleased with this hunt," said Kim Garner, youth activities coordinator for the Wildlife Commission. "Forty-seven of the 50 teams of adults and youths showed up, and 23 of the youngsters got their deer. Adults were not allowed to hunt, but supervised the youths — who were usually their sons or daughters. The teams had each completed a required orientation which included hunter-safety training. All of these young people hunted safely and courteously. They were real sportsmen in the best sense of the word."

Besides the good hunting it provided the youngsters, the hunt was designed to thin the deer herd at Cowan's Ford. In recent years, deer have expanded their population into the refuge and begun competing for food with the resident flock of Canada geese. Biologists have also noted a "browse line" on vegetation which indicates that the deer herd has grown to a number exceeding the carrying capacity of the land. This damages the habitat, and also increases the risk of an outbreak of disease. Depredation of crops and shrubbery and increases in auto-deer collisions have also been noted in the area.

In the past, deer have been live-trapped from the refuge and released on other areas as part of the Wildlife Commission's deer restoration program. However, this program is complete, and the animals are now found in every county in North Carolina.

"The youth deer hunt at Cowan's Ford was part of our youth involvement program," said Garner. "This program is similar to CA TCH (Carolina Anglers Teach Children How) — which is our new fishing program. The aim of both of these programs is to introduce young people to the outdoors. However, there's a lot more to this than just learning to hunt or fish. Both of these programs stress outdoor ethics and good sportsmanship. Also, safety is of the utmost importance — especially in the hunting program. By introducing youths to hunting and fishing — and teaching them to do it right — we're hoping to build better sportsmen and conservationists for the future."

Information on youth programs is available from the Youth Activities and Environmental Quality Section, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.

*Record Penalty For Erosion Violations*

## Mountain Developer Gets Big Fine

Erosion can be costly. Officials from Ecological Development, Inc. — a Miami, Florida, firm that has been heavily involved in second-home development in the mountains of western North Carolina — learned this recently when the state levied a record $68,500 fine against them for violations of the North Carolina Sedimentation Pollution Control Act.

The violations occurred at the firm's Three Top Mountain Subdivision near West Jefferson in Ashe County. Citations were issued for failure to file an erosion-control plan prior to construction, building roads with slopes and fills that were too steep to retain vegetative cover, and for failure to take erosion-control measures that would have prevented sedimentation from reaching the tributaries of the North Fork of the New River.

The problems at the Three Top Subdivision are nothing new, and water-quality problems caused by such mountain developments were featured in an article entitled "They're Tearing Up The Countryside" in the January 1984 issue of *Wildlife In North Carolina*. Officials from the N.C. Division of Land Resources had originally notified Ecological Development that their Ashe County project was in violation of state law, informed them of corrective steps needed, and set a compliance deadline of July 20, 1983. Subsequent inspections and efforts to work with the firm through May 29, 1985, failed to correct the violations. The firm is now required to bring the site into compliance or face additional fines and an injunction.

Ecological Development has also violated sedimentation laws at two other developments. In 1983, the state assessed a $22,000 fine against the firm for violations at a similar residential development in Rutherford County. And in May of 1985, the firm was cited with a $5,080 penalty in connection with its Riverbend Lake Lure Project, which is also in Rutherford County.

*Certified By Wildlife Federation*

## Sanford Teacher Likes CLASS Project

Dear Sirs:

I want to tell you how great I think it is that North Carolina is sponsoring such programs as Project WILD, CLASS Project, and the annual outdoor education workshops.

I participated in a CLASS Project workshop in Raleigh several years ago. I returned to my classroom and completed the activities, and also did a community action project on the recycling of aluminum.

I sent a copy of the application for CLASS Project to the headquarters of the National Wildlife Federation. In return, our class received a letter from Dr. Jay Hair, executive vice-president of the Federation, and a certificate for our efforts.

*— Hope Knight*
*Sanford*

*Several conservation-education programs at the elementary and secondary levels are offered by the Wildlife Commission. Teachers and others involved with youth organizations may obtain more information on these programs from the Division of Conservation Education, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.*

*Book Review*

## Audubon Report A Great Reference

*The Audubon Wildlife Report — 1985.* Softcover, 647 pp. Available for $16.50 (includes mailing) from the National Audubon Society, 950 Third Avenue, New York, New York 10022.

The Audubon Society's first annual wildlife report tackled a formidable subject, profiling the many federal agencies which are involved in wildlife management. In addition to exploring the wildlife programs of such diverse agencies as the National Park Service, Forest Service, Bureau of Land Management and Department of Defense, a lengthy section is devoted solely to the policies and programs of the U.S. Fish and Wildlife Service. Other chapters explore the status and management of a number of important wildlife species including migratory waterfowl, striped bass, grizzly bear, California condor, bald eagle and others.

This book is not casual reading. However, those involved in the management of wildlife and other natural resources — or private conservationists — will find it a valuable reference.

*Deadline For Orders June 30*

## Sportsman's Stamp Prints On Sale

Ken Taylor

***Thrill Of A Lifetime:*** *Wildlife artist Duane Raver of Cary captured the excitement of a largemouth bass hitting a topwater lure in the 1986 North Carolina sportsman's stamp.*

*Orders for limited-edition art prints of this stamp will be taken through June 30, 1986. Information on ordering prints is available from Sportsman's Print, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.*

## The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

**Status on September 30, 1985**

| | Numbers Sold | Revenue Received |
|---|---|---|
| Lifetime Sportsman's License | 15,163 | $4,333,892.15 |
| Lifetime Hunting License | 122 | 23,461.32 |
| Lifetime Fishing License | 885 | 154,297.49 |
| Lifetime Subscriptions to Wildlife in N.C. | 591 | 69,736.78 |
| Contributions | — | 63,307.71 |
| | Fund Total: | $4,644,695.45 |

*Both Are Easy, Delicious*

## Venison Recipes Pass Taste Test

Late last summer, employees of the Wildlife Commission put together a list of favorite family recipes for wild game. These were condensed into a booklet that was distributed at the State Fair.

Many people contributed to this effort, but the most intriguing submission came from Susan Sharpe of Hamlet. Susan is the wife of Terry Sharpe, the Commission's small game biologist, and she has put together a small gem of a cookbook entitled *Luck, Duck, Goose, and a Whole Lot of Deer.* We'll be bringing you some of her recipes — and those of Wildlife Commission employees — in upcoming issues of *Wildlife In North Carolina*. Curtis Wooten's column on cooking wild game will also appear on a regular basis.

"I've cooked or tried to cook just about everything," Susan explains. "This book is also written for those hunters who always cook their game the same old way because their wives 'wouldn't touch it with a 10-foot pole.' "

Here are two of Susan Sharpe's deer dishes — one suitable for a formal dinner, the other best saved for lounging in front of a fireplace on a cold winter day.

### Deer Roast

*4-5 pound deer roast*
*bacon drippings*
*1 pkg. Lipton onion soup mix*
*salt and pepper*
*onions, potatoes and carrots*

Brown deer roast in 3-4 tablespoons bacon drippings over medium to high heat. Be sure all sides have been browned. Place roast in crock pot. Add ½ to 1 package Lipton dry onion soup mix depending on size of roast. Add salt and pepper. Cover crock pot with lid and cook for 3-4 hours on high. Be sure you have enough water covering roast. When roast is done, you can pull it apart with a fork. Add potatoes, onions and carrots. I usually add a small amount of cabbage.

### Boy Scout Special

*1-2 pounds deer burger*
*3-4 large potatoes (washed and sliced with skin left on)*
*1-2 medium onions (sliced)*
*5-6 carrots (diced)*
*salt and pepper*

Form deer burger into patties, but don't pack them too tight. Place deer burgers on tin foil. Next place slices of onions, potatoes and carrots on top of burgers. Salt and pepper the meat and vegetables, and sprinkle Worcestershire sauce over the entire mixture. Wrap tin foil around very tight, and cook in oven at about 400°.

I usually make four individual meals — depending on who likes onions and who doesn't. This is my family's favorite way to eat ground deer meat, and is one of those meals that will stick to your bones.

## Calendar Of Events

**January 10-February 28**
Great American Indian Leaders exhibit on display at the N.C. Museum of History in Raleigh.

**January 14-April 14**
"Return of the Comet" — a show featuring Halley's Comet at the Morehead Planetarium at the University of North Carolina at Chapel Hill.

**January 15-19**
Mid-winter Horse Shows at the State Fair Horse Complex in Raleigh.

**January 22-26**
Central Carolina Boat Show at the Coliseum in Greensboro.


## The 1986 North Carolina Wildlife Calendars Are Here!

Along with twelve wildlife art selections, the 1986 North Carolina Wildlife Calendar features a complete almanac section including hunting seasons, wildlife facts, boating access areas, and ferry schedules.

For the perfect gift for your outdoor enthusiast, order a calendar today!

Please send me . . . . . N.C. Wildlife Calendars at $6.00 each $_____
Wake County residents add $.27 sales tax per calendar _____
Other N.C. residents add $.18 sales tax per calendar _____
Enclosed is my check for . . . . . Total $_____

Name _____
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City/State/Zip _____
Phone (_____) _____

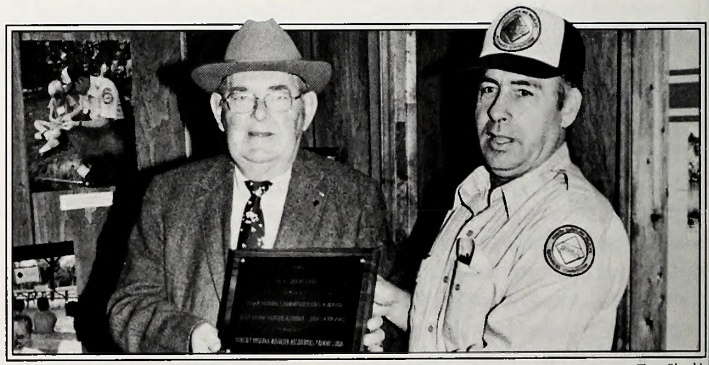
Send order to: CALENDAR; N.C. Wildlife Resources Commission; 512 N. Salisbury Street; Raleigh, N.C. 27611

All orders must be prepaid. We do not bill. A $10.00 charge will be made on returned checks. (N.C. G.S. 25-3-512).

For fund raising and bulk rate information (10 calendars or more), call 919-733-7123 for additional information.

**ORDER TODAY!**


## Wildlife Is Tops At The State Fair



Terry Shankle

***Head Of The Class:*** *The Wildlife Commission finished first in a competition for best educational exhibit at the 1985 North Carolina State Fair. Here, James Graham (left), commissioner of the N.C. Department of Agriculture, presents a plaque to Jack Donnelly, a Wildlife Commission employee who was manning the booth when the award was announced.*

Irene Sacilotto

**Catesby's "Blew Jay"**

Colonial naturalist Mark Catesby drew this blue jay in the early 1700s, one of many species he painted 100 years before Audubon.

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# Coping With The Groundhog Month

*by Jim Dean*

Most likely by the time you read this the infamous groundhog of Punxsutawney, Pennsylvania, will have made his or her February 2 appearance and determined what we can anticipate in the way of weather for the next six weeks. Legend has it that if this weather forecasting whistlepig doesn't see its shadow, we'll have an early spring. If the shadow is seen, we're in for six more weeks of frostbite.

I'll be honest. I have never put a lot of stock in this business of mammalian meteorology. Shucks, I've even known wooly worms to be wrong. Groundhogs notwithstanding, I have learned after more than four decades to expect February and early March to be the most consistently miserable time of the year. That is especially true for outdoorsmen. The hunting seasons are either closed or rapidly winding down, and it's still too early to do much serious fishing. That leaves us with few choices, none of them very satisfying.

*Leonard Lee Rue III*

Some sportsmen hibernate. That is, they spend the entire period on the sofa under a quilt—too cold to get up and change the channel, too cheap to buy a remote control, and too bored with it all to care very much one way or the other. Nothing short of a salacious Valentine from Joan Collins could get them to move.

Unfortunately, most of us are too restless to achieve such sustained somnambulance. It is an ironic fact that the fever to fish (or hunt, hike or do something) never burns more brightly than it does during this low ebb. The good folks who make fishing and hunting gear know this—bless their thoughtful little hearts—and they deluge us with countless mail order catalogs to feed the fever. You can spend hours browsing through these catalogs, but alas, the actual expenditure of money takes only a few moments, which means you've still got to find a way to kill nearly six weeks.

Most sportsmen have devised a rather tedious series of rituals to help them through this wasteland. I usually tie trout flies (at last count, I had 23,462 which should be enough to get me through opening day). I also clean reels, and by the time March rolls in, I am quite certain that no one in the world has reels any cleaner than mine. You could eat off them, but I guess that wouldn't make much sense.

Some sportsmen clean out tackle boxes, build new rods, repair nets, patch waders and fall asleep at night with the curl of a flyline gently depositing their souls on the rivers of nod. Others make duck decoys, refinish gun stocks, reload shotgun shells—and patch waders. Indeed, surf fishermen, duck hunters and trout fishermen may spend more time patching waders than they do in actual pursuit of their quarry. There is a school of thought that maintains that waders have a half-life of about 20 minutes, and that no matter how many holes you patch, there will always be two more. One of these will be just below the ankle, and the second hole will be at the point where the upper legs join the torso. Though invisible to the naked eye, each hole is capable of transferring four gallons of icy water per second from the outside of the wader to the inside of the wader—but only if you are in it.

Since patching waders is generally unrewarding, most sportsmen seek other pastimes. I have a friend who spent one February building a small plywood boat. He carefully measured the door to the basement so that he could get the boat out of the basement when it was completed. Then, he happily went about his work and constructed a most handsome little craft. Indeed, it is just as handsome today as it was six years ago when he finished it, and that is probably because it is still in his basement. While the width and depth of the boat would permit it to fit through the door with plenty of room to spare, my friend failed to take into account the fact that the wall in front of the door would prevent him from sallying forth with a boat any longer than 7-feet. His boat is 12-feet long.

Actually, the construction of that boat had served its purpose since it helped him pass the winter. I undertook a similar project last winter when I decided to build a dozen wooden duck decoys. Only two were completed at a modest cost of around $100 apiece, including the price of the wood, tools, glass eyes, paint and accessories, but those rather scruffy looking mallards helped me make it through the long winter nights. What more could I ask, or want?

This year, I've gone back to my customary construction of trout flies to pass the time. In fact, I've even discovered a place to try them out well in advance of the traditional opening day of the season in April. Not far from my house is a supermarket that prides itself on carrying a complete line of fresh fish. The trout are so fresh that they are swimming around in a large tank. I'm sure the manager would not mind if I brought my flyrod to the store and caught a few for supper. Of course, I'd need a shorter leader than normal, and I probably could get by with hip waders rather than full chest waders since the water is not very deep. I'd also have to watch my backcasts to make certain I didn't hook any passing shoppers, but I can't visualize any other problems. I've even figured out the precise fly pattern to use—an Ausable Wulff tied with groundhog hair. If there's a more appropriate fly to use for rainbow trout during the month of February, I can't imagine what it would be.

See, you really can find ways to survive this time of year if you don't get sidetracked by some foolishness.

February, 1986
Volume 50, Number 2

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Department of Natural Resources
and Community Development

S. Thomas Rhodes / Secretary

North Carolina Wildlife Resources Commission

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# WILDLIFE IN NORTH CAROLINA

*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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**Cover** *Though common within its range, the deer mouse is found only in the damp, cool forests of the western part of the state. It is distinguished from its close kin, the white-footed mouse, by the well-haired tail and particularly the tuft of hair at the tip. Photograph by James F. Parnell.*

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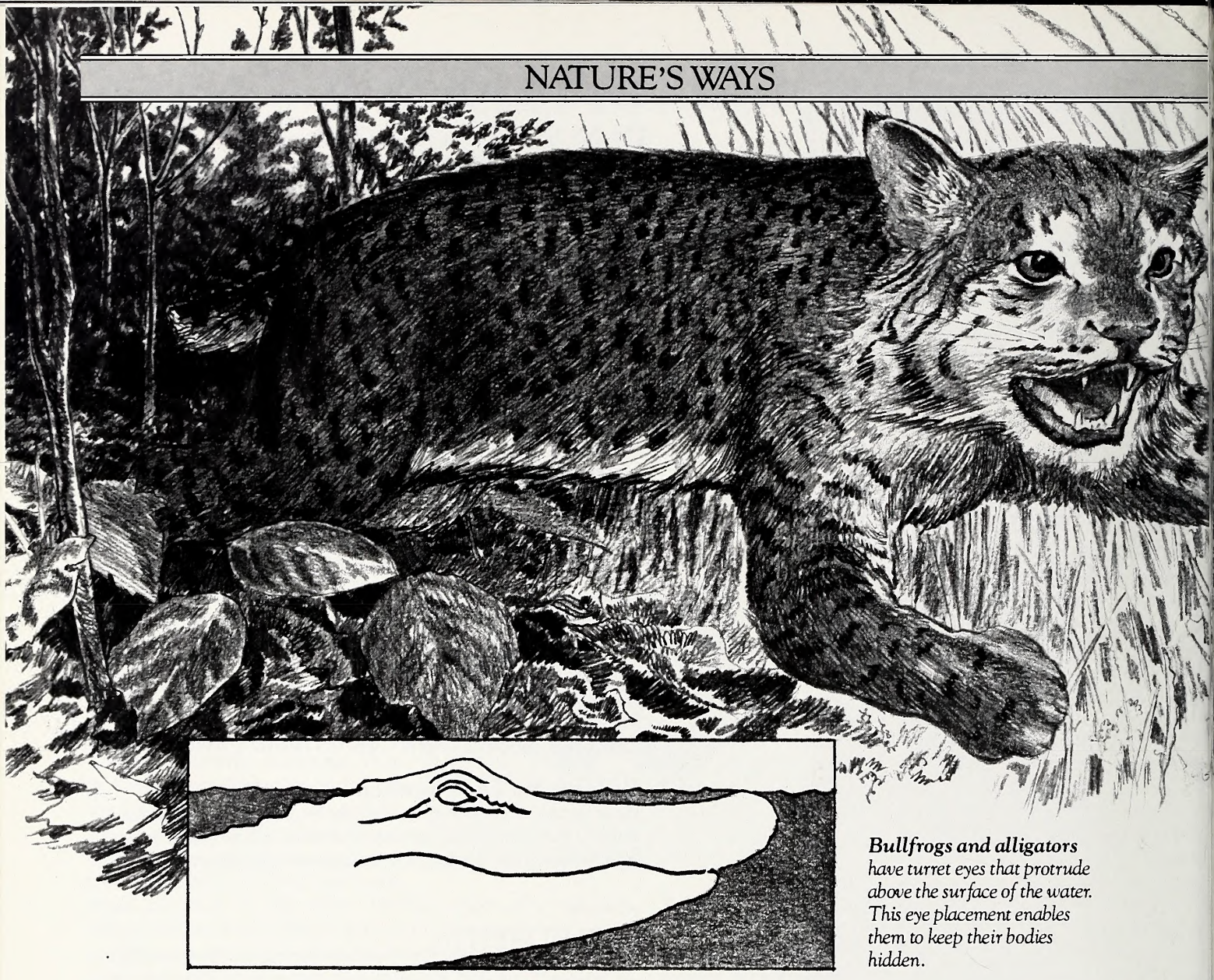


***Bullfrogs and alligators*** *have turret eyes that protrude above the surface of the water. This eye placement enables them to keep their bodies hidden.*

# Kinds Of Eyes

*written by Lawrence S. Earley / illustrated by David Williams*

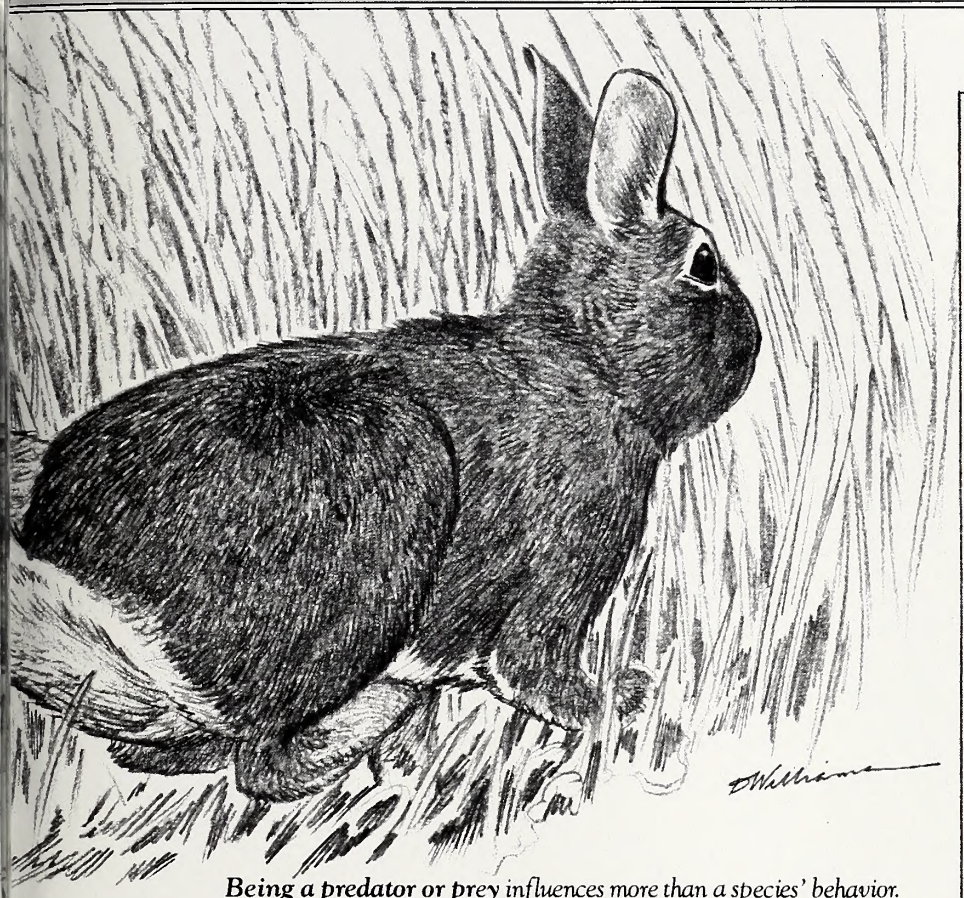
Poet Alfred Lord Tennyson once described nature as "red in tooth and claw," and indeed, there is something chilling about nature's world of hunters and hunted. The certitude that a dove or squirrel is destined merely to fatten a creature higher in the food chain may seem pitiless and unfair.

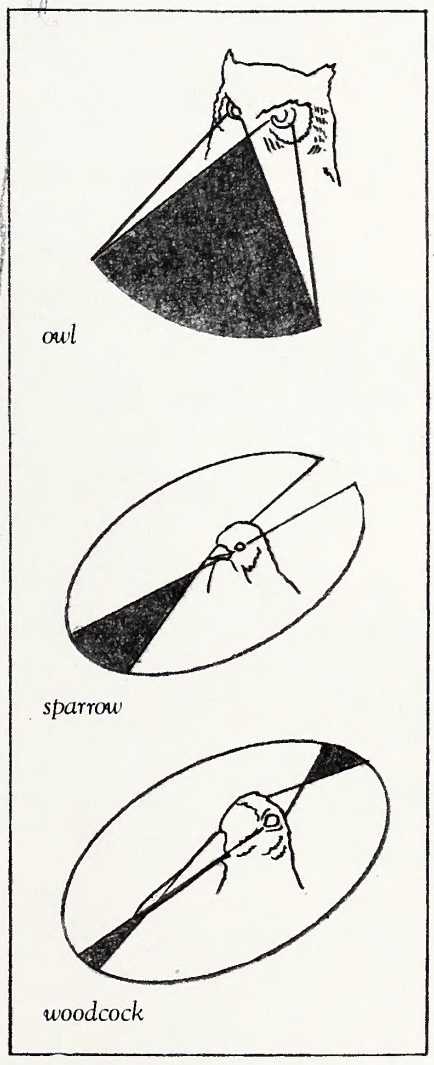
Are prey handicapped by nature? Did they somehow develop as weaker or inferior to hunters? Put another way, should we pity prey creatures because their blood will stain the ground, their bones be gnawed by strong teeth, their muscles be shredded by beak or incisor?

While allowing for individual responses to this complex question, one point of view is clear: Nature plays no favorites in the struggle for existence. She has equipped both predator and prey in equal measure to kill and to escape being killed.

One way of demonstrating this principle is to examine eye placement on animals. Predators typically have their eyes in front of their faces while the eyes of prey creatures are situated along the sides of their heads. Thus among birds, hawks and owls have frontally placed eyes while woodcocks and wading birds have laterally placed eyes. Cats and foxes and wolves are mammals with frontal vision, while the eyes of deer, squirrels and mice are placed on the sides of their heads.

To understand why eye placement is related to an animal's status as predator or prey, let's think about the way humans see. Our eyes appear on the front of our heads. Each eye moves in unison with the other so that when something catches our attention, both eyes focus on the object. Because each eye's plane of vision converges with the other, we have binocular vision — the same as when we move our binoculars so that the two separate circles overlap and coincide. Binocular vision is three-dimensional, enabling a






***Being a predator or prey*** *influences more than a species' behavior. Even eye placement is a result of an animal's status as carnivore or herbivore. Predators like the bobcat and the owl have eyes on the fronts of their heads. The resulting three-dimensional vision enables them to catch fast-moving prey. Prey species have eyes set on the sides of their heads enabling them to look out for predators all around them. In the illustration at right, the owl has a large area of binocular vision. The sparrow and woodcock have smaller areas of binocular vision but greater ability to see to the sides and to the rear. For a woodcock, a species that spends much of its time probing in the soil for insects, this ability is essential to survival.*

predator like ourselves to locate an object quickly and calculate how far away it is. This ability, of course, is critical for a hunter.

Eyes placed on the sides of the head rather than in the front diminish the degree of binocular vision the animal has, but extend the total area viewed well to the rear. Prey creatures can thus detect movements beside, behind and even above them much better than creatures with eyes in the front. Prey creatures differ among themselves in the extent of their "wrap-around" vision, but rabbits, for example, see about 340 degrees all around; woodcocks see nearly 360 degrees.

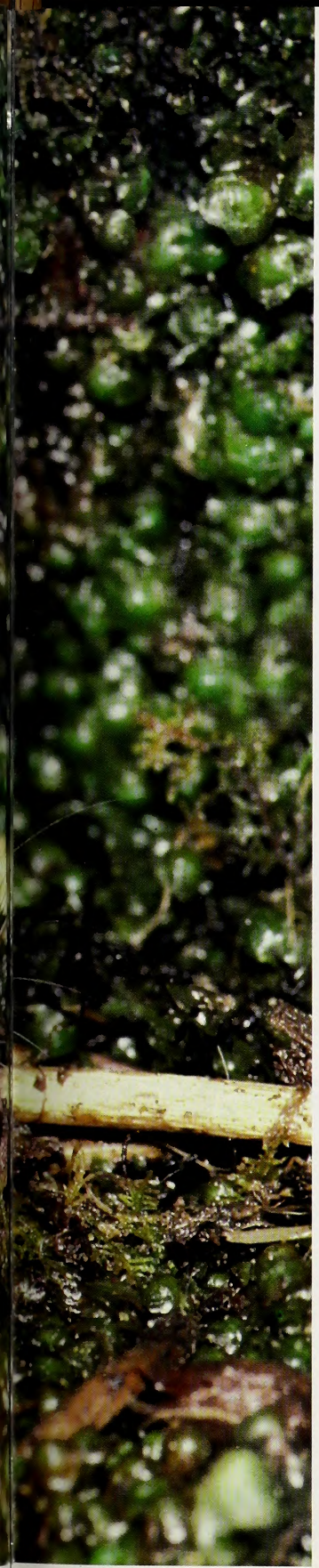
Eyes placed on the sides of heads are mainly monocular — that is, they see independently of each other and present two very different images to the brain. Thus a horse pulling a wagon down a country road might see a man on a tractor with its right eye, and a field of corn with its left eye. To keep its attention focused on the road, a farmer puts a pair of blinders on the horse, forcing it to look directly ahead where it has a small area of binocular vision.

Many animals with laterally placed eyes have a blind spot immediately in front of them because their heads or snouts actually prevent them from seeing. Rabbits have a blind area about a foot in front of them and song birds can't see much directly in front either. This is not a major problem, because the rapid head movements of these animals usually bring one eye to bear on a subject of interest in front of them. Birds are not puzzled when they cock their heads at a worm in the lawn — there are merely directing the vision of one eye onto the delectable morsel in front of them.

The dice aren't loaded against prey creatures, even though most will be eaten by predators. As predators and prey evolved in time, each developed sharper and sharper tools to enable them to survive. Eye placement is only one of the tools by which predator finds prey and by which prey escapes predator.

**Smoky Shrew** *(Sorex fumeus)*

It would not be unusual to live a lifetime without seeing a shrew, even though most species of shrews are relatively abundant. An encounter with a smoky shrew would be less common, however, because this tiny mammal lives mostly under the thick ground cover of leaves in the damp forests of the Appalachians. Though relatively widespread within this habitat, it is seldom seen except along roadside cuts where it may sometimes inhabit bare rock faces. Average-sized, as shrews go, its total length including tail is usually less than 4¾ inches. Smoky shrews eat salamanders, insects, centipedes, earthworms and have virtually insatiable appetites. Apparently, they rarely live much more than two years in the wild.



James F. Parnell

# Uncommon Mammals

## North Carolina is home to a lot of mammals that are seldom seen. Some are rare, some are merely secretive.

by Jim Dean

For many North Carolinians, it is rare to encounter more than a few of the more common wild mammals that live in the state. The urbanite who works in a metropolitan high-rise and commutes no farther than a surburban housing development could conceivably go for months without seeing anything less common than gray squirrels, a random rabbit or chipmunk, a smattering of mice and rats and perhaps an occasional raccoon or opossum.

Even the experienced outdoorsman may spend large chunks of time in the woods and fields without seeing such relatively common mammals as flying squirrels, bobcats, minks, weasels, shrews or other secretive species. It is even less likely to find yourself face to face (or face to muzzle) with some of North Carolina's least common mammals, or to be able to identify what you've seen.

The mid-Atlantic states of Maryland, Virginia, North Carolina and South Carolina are rich in mammal life, and the region is home to 75 species of native terrestrial mammals. An additional 33 species of marine mammals can be found at times in the ocean and sounds. Five species of mammals — the elk, bison, red wolf, gray wolf and porcupine — could once be found in this region, but have since disappeared here although they exist elsewhere. Some species, such as the fisher and beaver were also extirpated, but have been reintroduced. Indeed, beavers are very common now.

In at least one case, the status is simply not known. It is thought, for example, that mountain lions still exist in small numbers; however, it is likely that this is an introduced sub-species of western mountain lion rather than the original eastern cougar.

In addition, at least eight species of exotic mammals (meaning that they are not native to this region) have been introduced here and have become well established. Some of these — the house mouse, Norway rat and black rat — are considered pests, while others like the European boar, coyote and nutria have had mixed greetings.

Mammals are vertebrates (having backbones) of the class *Mammalia*, including man, that feed their young with milk from female mammary glands and have bodies more or less covered with hair. Also, with few exceptions, they give live birth rather than lay eggs. Fossil records reveal that the earliest mammals appeared about 250 million years ago, and some small mammals were on the earth during the reign of the dinosaurs. After the extinction of the dinosaurs some 65 million years ago, mammals flourished. Not all of the early mammal groups survived — some becoming extinct during the long evolutionary process which continues today.

The fact that most mammals tend to be secretive makes them less likely to be spotted by casual observers. Also, many are also nocturnal, feeding and prowling at night and sleeping or resting throughout most of the daylight hours.

Shown here are some of the less common mammals which might be found in North Carolina, along with an explanation of their probable status. Some of these are fairly common within their known ranges, while the existence of others has not been firmly established.

The photographs and some of the information found here come from a new book published by the University of North Carolina Press, and *Wildlife In North Carolina* expresses its appreciation to the publisher and authors for the permission to excerpt this material. *Mammals of the Carolinas, Virginia and Maryland* by William David Webster, James F. Parnell and Walter C. Biggs, Jr., copyright 1985, is available in bookstores or from the University of North Carolina Press, P.O. Box 2288, Chapel Hill, NC 27514 for $16.95.

James F. Parne

**Fox Squirrel** *(Sciurus niger)*

The fox squirrel is the largest of the North American tree squirrels, and those found in North Carolina are normally even larger than fox squirrels found elsewhere, reaching lengths of 26 inches and weighing up to 2½ pounds. There are two separate populations in the state, the largest in the mature longleaf pine and oak forests of the Sandhills and southeast. Where habitat is good within this region, these squirrels are fairly common. Their coloration is a pale gray with black feet and face. Some are almost entirely black with a white nose and toes. Another color variation occurs in the far western mountains where these squirrels are a yellow-brownish color with a rusty-colored tail, but their population is diminished here. Fox squirrels spend more time on the ground than gray squirrels, and feed on acorns, hickory nuts, pine seeds and fruits.

Bill Sanderson

**Swamp Rabbit** *(Sylvilagus aquaticus)*

From its name, one would expect to find the swamp rabbit in the coastal lowlands with the marsh rabbit, but this deep south rabbit's range extends north and east only into the far westernmost parts of North Carolina in Clay County where it is thought to be very uncommon because habitat is not favorable. Normally, this rabbit occupies floodplains, river swamp forests and canebrakes and is a good swimmer in this watery habitat. Reaching weights of up to 6 pounds, it is larger than the cottontail.

# Not all uncommon mammals are rare, just infrequently seen.

James F. Parnell

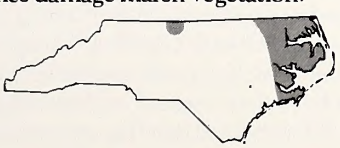
**River Otter** *(Lutra canadensis)*

Considering their size—between 11 and 23 pounds—and the fact that they are still relatively common in the Coastal Plain, you might think that the river otter would be seen regularly. Actually, few of us are ever fortunate enough to see these highly intelligent and playful creatures because their secretive nature usually overcomes their curiosity. Otters normally feed heavily from dawn to midmorning and again in the evening, preferring such slow-moving fish as suckers, carp and catfish. They eat crayfish, amphibians and other aquatic creatures. Destruction of habitat and water pollution have taken a toll, and populations have declined especially in the Piedmont and mountain regions.

James F. Parnell

**Nutria** *(Myocastor coypus)*

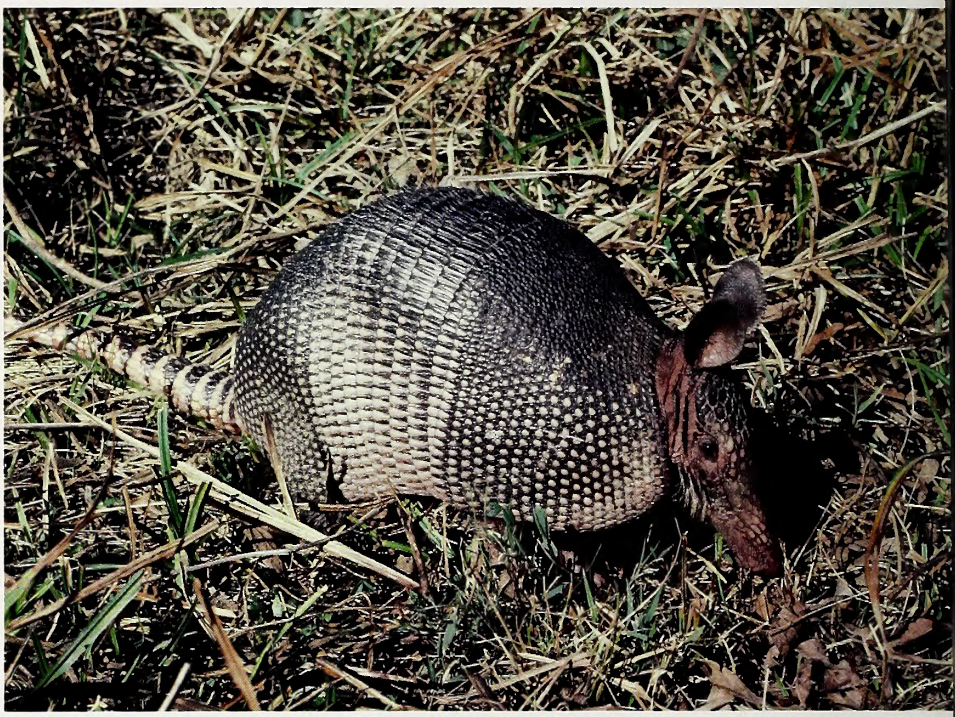
Resembling a very large muskrat, the nutria is not native to North Carolina, but was introduced from South America along the Gulf Coast and later along the Carolina coast. It is common in Currituck Sound, and also found in Pamlico Sound and other coastal areas with some inland records as far west as Rockingham County. Nutria reach lengths of over 3 feet and may weigh as much as 20 pounds. Primarily a nocturnal herbivore, nutria feed on a variety of marsh plants and sometimes damage marsh vegetation.



# Some uncommon mammals may not live here after all.

**Nine-banded Armadillo**
*(Dasypus novemcinctus)*

As is the case with the other mammals on these two pages, the armadillo's presence in North Carolina is uncertain. Unique among North American mammals with its body covered by a protective armor of fused bony plates overlain by leathery skin, the armadillo was first recorded in Texas. It has spread north and east, and there have been scattered reports from North Carolina's Piedmont although these are thought to have escaped from captivity. South Carolina is believed to be the armadillo's current northern limit, but even there its status is unknown. Armadillos feed primarily at dusk and night on insects and invertebrates, digging up amphibians, roots, and other soft food with powerful forefeet and claws. They can literally walk underwater to cross streams, remaining submerged for up to 6 minutes. Because they are susceptible to leprosy, they are valuable in medical research.



Bill Sanderson

Bill Sanderson

**Coyote** *(Canis latrans)*

Odd as it may sound, the coyote we associate with the far western plains, keeping cowboys company while howling at the moon, is actually now a resident of North Carolina. Though reports are not common, individuals have been collected here which are thought to have spread either from their original western range or been stocked privately. It is expected that this opportunistic mammal's numbers are likely to increase in the east. This member of the dog family prefers open country where it feeds on a variety of prey, especially rabbits, rodents and birds. Adults normally weigh between 20 and 44 pounds. Coyotes may also hybridize with dogs, especially feral dogs.

ames F. Parnell

James F. Parnell

**Black-tailed Jack Rabbit**
*(Lepus californicus)*

The jack rabbit is native to western North America, but it has been privately introduced into several eastern states, and is now fairly common in the eastern shore areas of Maryland and Virginia. Although their presence in North Carolina is uncertain, it would not be surprising to find a breeding population here at some time in the future. The jack rabbit's long ears (over 5 inches), long hind legs, and large size (up to 5½ pounds) make it easy to distinguish from native cottontails or marsh rabbits.

**Mountain Lion** *(Felis concolor)*

Although there is little doubt than mountain lions have been seen in North Carolina in recent years, no specimen has been collected, and there is a general belief that any lions inhabiting the state today or have escaped from captivity. The native eastern cougar subspecies — one of 11 in North America — is thought to have become extinct over 100 years ago. These tawny-colored (never black) cats have very long, black-tipped tails and measure overall 7 to 9 feet, weighing up to 200 pounds. Because white-tailed deer, their favored prey, have become far more numerous and widespread in North Carolina in recent years, it is entirely possible that these large cats could survive in the eastern swamps or remote mountains.⊠

**The names of many places in North Carolina have curious origins.**

# Which Way To Beaverdam

**by Lawrence S. Earley**

I'm about as level-headed as the next man, but I spent a night without sleep recently trying to do a friend a favor. I'm not sure I'd like to repeat the experience.

It all began when my writer friend, Fred, came over wearing an expression of deepest melancholy. Fred thinks up names for a living. Some of his recent clients, for example, have been paint companies who hire him to name shades of paint. If you've ever been to a paint store you've probably brought home paint samples on little rectangles, each with a distinctive moniker printed just below. Not ordinary names, either. Any jackanapes could come up with White, Yellow, and Gold, after all, but who would buy colors with such dull, uninteresting names? What sells is mood, mystery. Take the same colors and name them Moonglow, Panama Hat and Summer's Kiss and you won't be able to keep them on your shelves. This is Fred's world, and he's paid plenty, believe me.

On this night, as I said, Fred had the kind of hangdog look associated with out-of-work politicians. "Names are hard," he was muttering as he came in.

"How's that?" I asked.

"Names," he repeated. "They're hard to come up with. I'm having trouble coming up with a good name for a 300-acre condominium development. And in this business, you know, names are everything. It's got to be something soothing, something pleasantly old-fashioned — something that'll cause customers to sleep-walk down to the bank and lay waste to their bank accounts. I mean, this is a pretty big decision."

I agreed and asked him what he had come up with so far.

"How does Blissful Acres sound, or Laurel Glen? Running Brook?"

"Sounds like a cemetery, a Valley girl and an Auburn halfback," I said.

"I was afraid of that," said my friend, shaking his head sadly. "Naming places is a lot harder than naming colors."

"How about Falling Timbers, to stress the workmanship of the development," I offered. "Or maybe Cramped Quarters. What about Plywood Heaven to emphasize the fine building materials?"

My friend left in a huff, and I felt badly about it for a while. The truth is that naming something is a high art nowadays and freighted with significance. Even naming a child is an ordeal that can severely strain a marriage. It's only after reading several books, perhaps a consultation or two with a psychologist and some knock-down-and-drag-out fights with in-laws that one settles on a name that mentions the child's origins while summing up boldly your hopes for its future. Little wonder the result often sounds like a cross between a boutique and a champion stud quarter horse. "We've had a girl! Opal Houndstooth Jones."

# Creek?

The more I thought about my friend's predicament and my treatment of him the worse I felt. Finally I resolved to come up with a few names, a handful, mind you, under the rubric that friends in need require a friend in deed. To inspire me, I pulled down William Powell's *The North Carolina Gazeteer* (University of North Carolina Press, 1968. $12.50). This book compiles in dictionary form the names of all North Carolina places, past and present, that the author could come up with. I figured that a 550-page book containing 20,000 names would be about as useful a quarry from which to hack out a name as I could get.

Well, it was a fateful decision. I got no sleep that night.

Now you may well ask why would browsing through a gazeteer deprive anyone of his sleep. Anyone who asks that just hasn't read this book. Towns, cities, communities, rivers, creeks, mountains—anyplace that European and Indian set foot and pinned a name on gets a place in this book. It's an astonishing document. It probably says more about our forefathers, the settlers of this state, than half the weightiest tomes and fully three quarters of the learned articles ever written about the Old North State.

Names are hard? On the contrary, naming a place was once as easy as burning up your shoes in a campfire.

Which is the way that Defeat Branch got its name in Swain County. Seems that a hunter fell asleep one night in a snowfall and snuggled up too closely to the fire. To commemorate the event he looked around for the nearest body of water and gave it a name that has endured these many years, although it's difficult to tell whether he was talking about his emotional predicament or the pain in his extremities when he hiked out the next day.

This proved to me that people weren't always as serious about naming places as my friend is. Of course the town fathers didn't have to worry about tourism in those days, and so they could be just as whimsical, droll and ornery as they wanted. How else explain how Aho got its name. According to Powell, local story has it that after being unable to come up with a name for this Watauga County community, the town gents decided to call it whatever word was spoken next. The story doesn't explain why the word was Aho!, but it could have been that the young school teacher just happened to walk by that instant eliciting that comment from one of the gents. Perhaps if she hadn't materialized the town would be known as Ahem today.

Actually, Aho was only one in the Ho family. There is a village of Ho-ho, and another named Tally Ho after the fox hunting that was popular in the area. There's also a Juney Whank Branch, a Charlies Bunion Mountain, a couple of Shooflies, a pocosin called The Wild Side and a Sampson County community named Easy Street, a place I've

*Illustrations by Jackie Pittman*

always wanted to visit, if not stay for a long, long time. Powell mentions that Matrimony Creek was so named by a married fellow because the creek was "noisy and impetuous."

One thing about our forefathers — they did have a sense of humor. After taking a couple of months to get to the New World and several more to push into the North Carolina wilderness, swat mosquitoes, beat back disgruntled Indians, and all the while thanking God for religious freedom and the chance to make their fortunes — after all that, they spread their sleeping bags in a little glade and named it Peru. Or perhaps a bunch of them moved down the road a bit, cleared the land and called it Arabia. Or Troy, Sparta, Perth, Tunis, Carthage or a half dozen other names of classical or exotic derivation. Some people say that demonstrates our forefathers' familiarity with classical literature. To me it only proves that they were human. After they had gotten to where they wanted to get, and seen what it was, they decided they really wanted to be somewhere else.

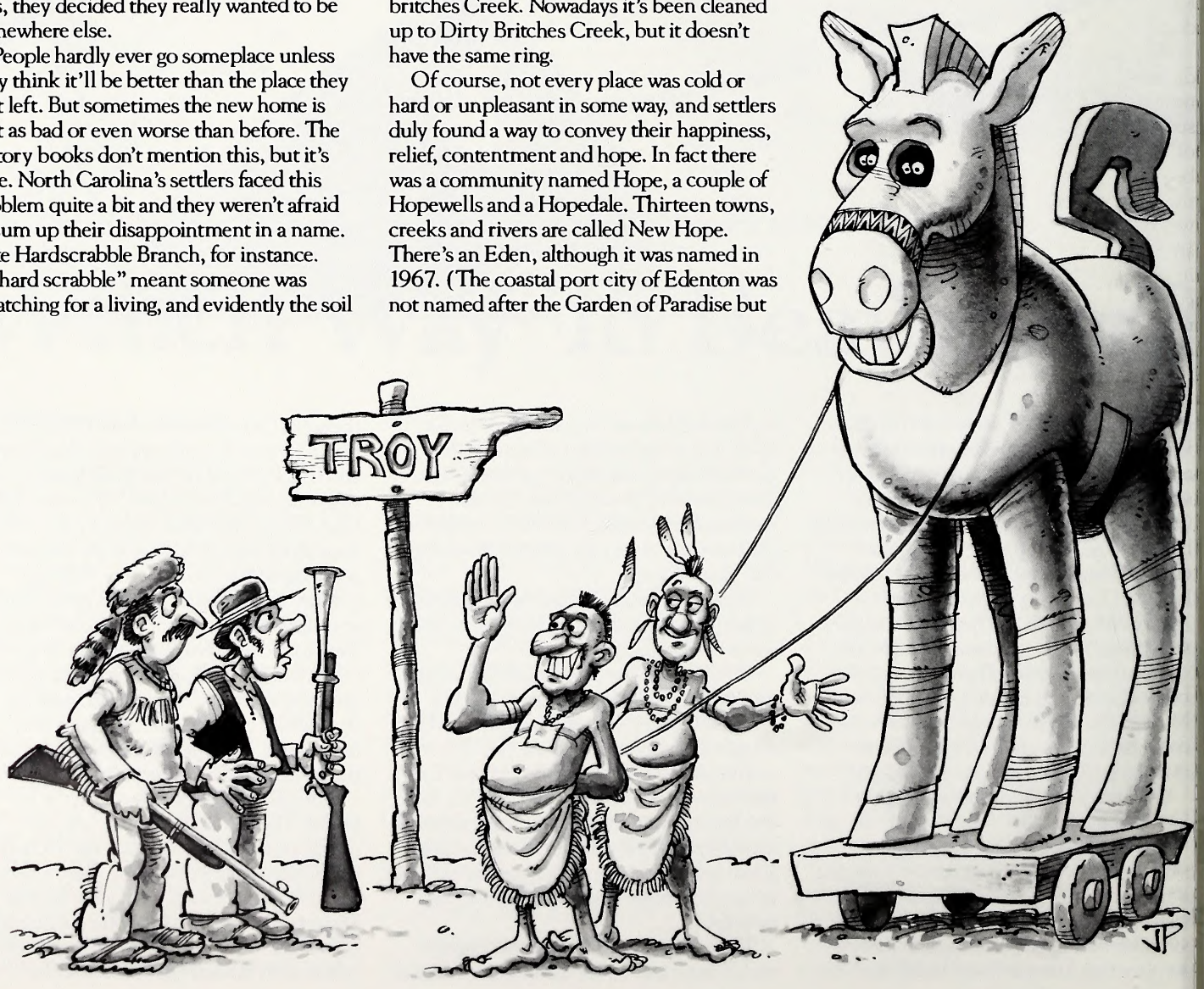
People hardly ever go someplace unless they think it'll be better than the place they just left. But sometimes the new home is just as bad or even worse than before. The history books don't mention this, but it's true. North Carolina's settlers faced this problem quite a bit and they weren't afraid to sum up their disappointment in a name. Take Hardscrabble Branch, for instance. "A hard scrabble" meant someone was scratching for a living, and evidently the soil in that corner of Yancey County was so bad that the name stuck. What's surprising is that there weren't more Hardscrabbles, although there is a Hardbargain Branch, six Pinchguts, two Hungry Mountains, three Lickskillets and a Parched Corn Bay. I also found a Desolation Branch, several Troublesome Creeks, a Kick Shin Creek, Rip Shin Mountain and a Sorrow Creek. Caswell County's Rabbit Shuffle got its name, says Powell, because the soil was so poor "a rabbit had to shuffle to get his rations."

Evidently in those days people weren't afraid to admit that the new country was hard or disappointing or tragic, although it's not a fact that my friend could make use of. Another thing he couldn't learn from was their blunt use of the King's English, so to speak. If they were out hunting and followed a creek that didn't have a name, they'd pin a label on it that summed up exactly how they felt. That's the way Cold ___ Creek got its name. Or if someone had an accident and had to clean his pants, well, why not ____ britches Creek. Nowadays it's been cleaned up to Dirty Britches Creek, but it doesn't have the same ring.

Of course, not every place was cold or hard or unpleasant in some way, and settlers duly found a way to convey their happiness, relief, contentment and hope. In fact there was a community named Hope, a couple of Hopewells and a Hopedale. Thirteen towns, creeks and rivers are called New Hope. There's an Eden, although it was named in 1967. (The coastal port city of Edenton was not named after the Garden of Paradise but after an early governor, Charles Eden.) Then there are a host of names that say "I'm glad to be here," including Eureka, Excelsior, Prosperity, Providence, Delight, Safe and Delightful Plains.

If the good people found their new settlement to their liking, they also told you why. Blank Ankle, a Roberson County area, was named after its fertile, black soil and there are a litany of Rich Creeks, Branches, Coves, Mountains, Gaps and Knobs, as well as Richland and other derivatives. In this incontestably Anglo-Saxon and Celtic state, there was even a Sans Souci, a Bertie County community that means "without care or worry" in French. (Of course there is also a town called Worry in Burke County.) Then there was Bachelor's Delight Swamp, a place that could only have been named by a married man on a short tether.

People's names get attached to places in odd ways. Of course there are the institutional names, shall we say — the Raleighs,



the Charlottes, Wilmingtons, Washingtons, Morgantons, Mecklenburgs and many more towns and places that were named after important national, state or even European figures. And then there's Daniel Boone who got around quite a bit, leaving Creeks, Branches, Forks, Ridges, Caves, Gaps, Crossroads and Townships scattered behind him like pick up sticks.

But I like the unknown names, the little guys whose names got attached to places. That's democracy for you when a fellow can see a ridge up ahead and say, "Say, I think I'll name that one after myself." There's a flock of Bill names, for example: Bill Cole Mountain, Bill Holt Mountains, Bill Moore Creek, Bill Wray Gap and Bill Allen Branch. There are also Bobs, Johns, Joels, Wills, Jacobs, Peters, Zacks, an Estelle and an Esmerelda. And you can't get much simpler in the naming game than pure possession: This is mine! So we have Billys Creek and Bobs Creek, Jinnys Branch and Jims Beech Ridge, Keiths Swamp, Joes Fork and Johns Knob. Who owns that Gap over there? Joe does. One hundred percent American.

Even religious names have a pithy directness about them that bespeak a no-nonsense approach to naming. What may be surprising—but shouldn't be—is how often the devil and his attendants seemed to be present in early North Carolina. Indeed, the practice of tagging someone else's home with a disparaging sobriquet was an advanced art in those days and you could always reach into the Old or New Testaments to find a good one. An early circuit rider named a rough-and-tumble Buncombe County community Sodom Hollow and a Yancey County creek near a rowdy sawmill camp was called Sodom Branch. Places like Pharisee Swamp, Hell Swamp and Hell and Purgatory pocosins spoke volumes about attitudes toward wetlands in those days. A sinister rock formation in Transylvania County was dubbed Devils Courthouse, but the Devil had his residence in 26 other creeks, dens, knobs, gardens, forks, prongs, kitchens, nests and even in one 'tater patch.

Of course, a good deal of the time settlers were a bit more positive about their experiences. There are Mount Gileads, Mount Hermons, Mount Zions, Mount Pisgahs and Mount Carmels. There is a Nazareth, a Samaria, a couple of Bethlehems, a bushel of Bethels, Bethanys, Bethabaras and even a Chapel Hill. There's a Faith, a Hope and a Charity (although the greatest of these may not be Charity). Shake a stick and out will pop the aforementioned Eden, Ebenezer, lots of Sharons, an Ephesus, a Devotion and eight Providences, with one of them, a community in Caswell County, known locally as Hell's Half Acre. That may seem

surprising, but it's not unusual: some people have been calling Chapel Hill Satan's Playground for years.

Though our forefathers were a pretty creative bunch most of the time, they got stuck when it came to animals. There are scores of places named after an animal, everything from alligators to wolves. In order of popularity, bear was first with 148 places. Then come beaver (102), buck (71), wolf (70), turkey (50), panther or painter (43), elk (40), buffalo (39), rattlesnake (34), and eagle (24).

Granted there were a lot of bears around in those days, but did that require settlers to name something after every bear they saw? At the rate they used bears as names it's a true wonder they ever got around to another name. In their defense, it is worth remembering that a lot of these animals they had never seen before. A bear was not a wilderness creature in Europe but a pitiful creature displayed in carnivals for dogs to bait. Alligators were wholly new, and so were elk, passenger pigeons, buffalo and beaver.

But my defense of them goes only so far. Nothing can defend their overuse of Beaverdam Creek. Of the 102 places named in some fashion after beavers, 64 of them are named Beaverdam, and 28 of them are Beaverdam Creek. This shows a total breakdown in the science of naming, for a name ought to identify a single place. But what's the poor hunter in Wake County going to do today when he tells his buddy to meet him at the head of Beaverdam Creek in the morning? Can he say this and leave it go at that. Heck, no! Why he's got to get out his map, you see, and say, "Now I don't mean the Beaverdam Creek near Neuseoca Lake, and not the one over near N.C. 97, and certainly not the Beaverdam Creek near Falls Lake. I mean the Beaverdam Creek three miles west of ...." You can see what calling four different creeks in the same county by the same name can do.

It was a surprising and an eye-opening night, I must say. I picked up facts and anecdotes about North Carolina history that no textbook had ever given me. But in one respect it was disappointing—at the end I was no closer to finding a name for my friend's condominium development than before. I was too tired to think about it at that point so I decided to go to bed.

As I fell asleep in dawn's gray light, I had the strangest dream. I was playing cards and had jacks and kings in Deuce's Quarter. Suddenly there was a fight and I fell into Tumble Bug Creek. I pulled myself out and found myself in Hanging Dog, but I didn't stay long. I labored in Purgatory Pocosin for what seemed like ages, just missed Hell Swamp and Dead Backwater and finally reached a trail on Polecat Ridge. I passed through Candor, Wit and Intelligence and took a drink in Toddy. Finally I arrived in Delightful Plains. Some people were painting a house and I joined them, but when I looked at the paint can the color was called Brightwater Branch.

Which is the name I suggested to my friend Fred that afternoon. He liked it. ☒

# Birdwatching At Sea

*Some birdwatchers will go almost anywhere to see their quarry, and 60 miles east of Hatteras is turning out to be a better spot than most.*

*by Mark Taylor*

Dawn breaks sullenly. A gray blanket of clouds covers the sky, spitting rain and grudgingly yielding to the pink of the rising sun on the eastern horizon. A steady line of sport-fishing boats roars out the channel bound for Oregon Inlet and the blue waters of the distant Gulf Stream. Captain Allan Foreman of the *Country Girl*, a 50-foot sport fisherman berthed at Manteo, scans the water for stray pilings and other debris.

"Going to be nasty outside the inlet," he hollers. "We've got a northeast wind and the current is flowing south. That'll push the sea up into a chop."

He's right. Minutes after clearing the inlet we're pitching and rolling in 6-foot seas, and soon half the passengers are doubled over the rail.

What could possibly make this misery worth enduring? Big fish? Sure. But, on this trip we're after different game — sightings of rare pelagic birds, birds that spend their lives on the open sea.

Mark Taylor

***Some of the best*** *pelagic bird-watching in the country is found off Cape Hatteras, and birders come from all over the country to add three rare species of petrels to their life lists.*

This offshore birding trip was organized by Derb Carter and his wife, Ann Darby, of Raleigh. Derb is director of the National Wildlife Federation's southeastern field office and Ann is a professional tennis player, but their avocation is serious birding. Together, they have traveled throughout the United States, Canada, and Central America pursuing their mutual obsession. For this trip they have assembled a dozen serious birders, and two members of the party have traveled from central Kentucky for the weekend on the 50 percent chance that the weather will allow us to go offshore.

"The waters off Cape Hatteras are a real hotspot for seeing pelagic birds," Derb explains as we duck behind the flying bridge to dodge sheets of spray. "In fact, a greater diversity of sea birds and marine mammals has been found off North Carolina than anywhere else in the Northwest Atlantic. Compiling life lists is the closest thing there is to competitive sport in birding, and the chances of seeing three particular species of sea birds are better off North Carolina than anywhere else. If a birder wants to bag the black-capped petrel, whiteface storm-petrel, or band-rumped petrel for his life list, he's got to come to Cape Hatteras. And people come from all over the country to do that."

What makes North Carolina's waters such a great place for offshore birding? A combination of factors. Cold waters from the north and subtropical waters from the south meet at Cape Hatteras, and this ecological break forms the northern and southern range boundaries for many temperate and subtropical birds — much as it does with fish. Upwellings of nutrients from the continental shelf also occur where the warm waters of the Gulf Stream mix with the cold waters of the southerly flowing Labrador current. These upwellings form rich food chains. Plankton and zooplankton utilize the nutrients, small fish feed on this marine life, and predatory fish hunt the smaller bait fish. Sea birds eat the scraps of tissue left by the bigger fish, and also feed on the oils and waxes naturally emitted by fish or found in "chum slicks" resulting from predation.

"Bird at 8 o'clock," Derb shouts, pointing at the horizon. Heads rise from the rail and binoculars appear. "Wilson's storm-petrel," someone answers, and heads nod in agreement. Searching through binoculars for the distant speck, I locate only blurred swells no matter how hard I try to steady myself by entwining arms and legs through the rails of the bridge.

Eventually, I get lucky and glimpse a small, chocolate-colored bird with bars of white on its wings and tail. It's difficult to see it bobbing on top of a wave. The Wilson's storm-petrel is a common sight offshore, breeding in rocky islands in the Caribbean during the winter and venturing as far north as Newfoundland and Labrador during the summer. Later, we see two other

petrels. The Leach's storm-petrel looks much like the Wilson's storm-petrel, but is slightly larger and has a forked tail. It nests in the Arctic, but winters south to Cape Hatteras. Eventually, we also see 11 of the much sought-after black-capped petrels, large, gray and white birds that soar over the waves on long, backswept wings. These also breed in the Caribbean, but are considered uncommon everywhere.

Clumps of sargassum weed appear, and the water turns a dark blue. We've reached the Gulf Stream, and the seas flatten out as the wind and current run in the same direction. Better yet, the skies clear and we break out lunch. We're overtaken by a Chinese freighter, and return the waves of the deckhands.

We're running north now, trolling for seabirds. I'm struck by the similarities between offshore birding and fishing, and am not surprised when the captain rigs two rods for dolphin or kings. It's a combination he's quite fond of.

"We often pick up a few fish on birding trips," he says. "The best birding and best fishing are found in the same areas—along the edges of the continental shelf or the weed lines in the Gulf Stream."

It's also a combination that Foreman has turned to his advantage. He's been a charter-boat captain since 1972. In 1975, David Lee, the state ornithologist at the N.C. Museum of Natural History, began going offshore with Foreman as part of Lee's pioneering research on pelagic birds. Through Lee, he developed a deep interest in offshore birds and between fishing charters began carrying parties of interested birdwatchers.

"I recently had the *Country Girl* refitted for offshore birding, and I carry about 25 birding parties a year," said Foreman. "Walkways were extended three-quarters of the way up the bow, and the cabin and flying bridge were enlarged so she can carry 27 passengers. This setup has also been ideal for bottom fishing and diving charters. We also run eight to 10 birding trips annually on our 60-passenger headboat, the *Crystal Dawn*. I enjoy the variety of alternate birding, fishing and diving trips. Birding has become a significant part of our business, and interest is growing every year."

We spot a few Audubon's shearwaters. These small, ashen and white birds breed in the Bahamas and are common throughout the Southeast Atlantic. Action is slow, though, and Derb takes a plastic jug of fish oil and dribbles it in our wake.

"Chum slick," he says, "just like fishing. Unlike land birds, sea birds have a keen sense of smell. Sometimes the sky will be empty, and within 10 minutes of putting out a slick the water will be covered with birds."

James F. Parnell

***Schooling fish*** *and upwellings of nutrients attract sea birds such as these Wilson's storm-petrels.*

Today, however, the slick fails. We spot a few red-headed phalaropes, the only member of this sandpiperlike family that ventures far from shore, and several terns that are too far off to identify.

It's mid-afternoon, and we head for home. Allan spots a cloud of specks on the horizon, and alters course. A school of tuna is feeding on baitfish, and hundreds of Cory's shearwaters are benefitting from the carnage. These beautiful gray birds are the largest of the Atlantic shearwaters, and are closely related to the albatross. We circle the flock until the tuna quit feeding, and the birds disperse.

"Cory's shearwaters breed in the Mediterranean and migrate thousands of miles every year," Derb says in admiration, lowering his binoculars. "No one really knows much about pelagic birds. Most of the data comes from the breeding grounds, but these birds spend nearly their whole lives on the open ocean. They usually lay one or two eggs, which indicates they live a long time—some ornithologists think their life span equals man's. They're able to drink saltwater, and migrate tens of thousands of miles every year. These birds come from everywhere and information on their migrations and distribution is really sketchy. This is one area where amateur birdwatchers can make a real contribution."

We reach Oregon Inlet shortly before sundown. It's been a great day. I've spent a day on the water, picked up 10 new species for my life list, and won't even have to clean the catch at the dock. ⊠

# NEAR MISSES!

## A wildlife enforcement officer's job is dangerous, never-ending, occasionally humorous and sometimes rewarding.

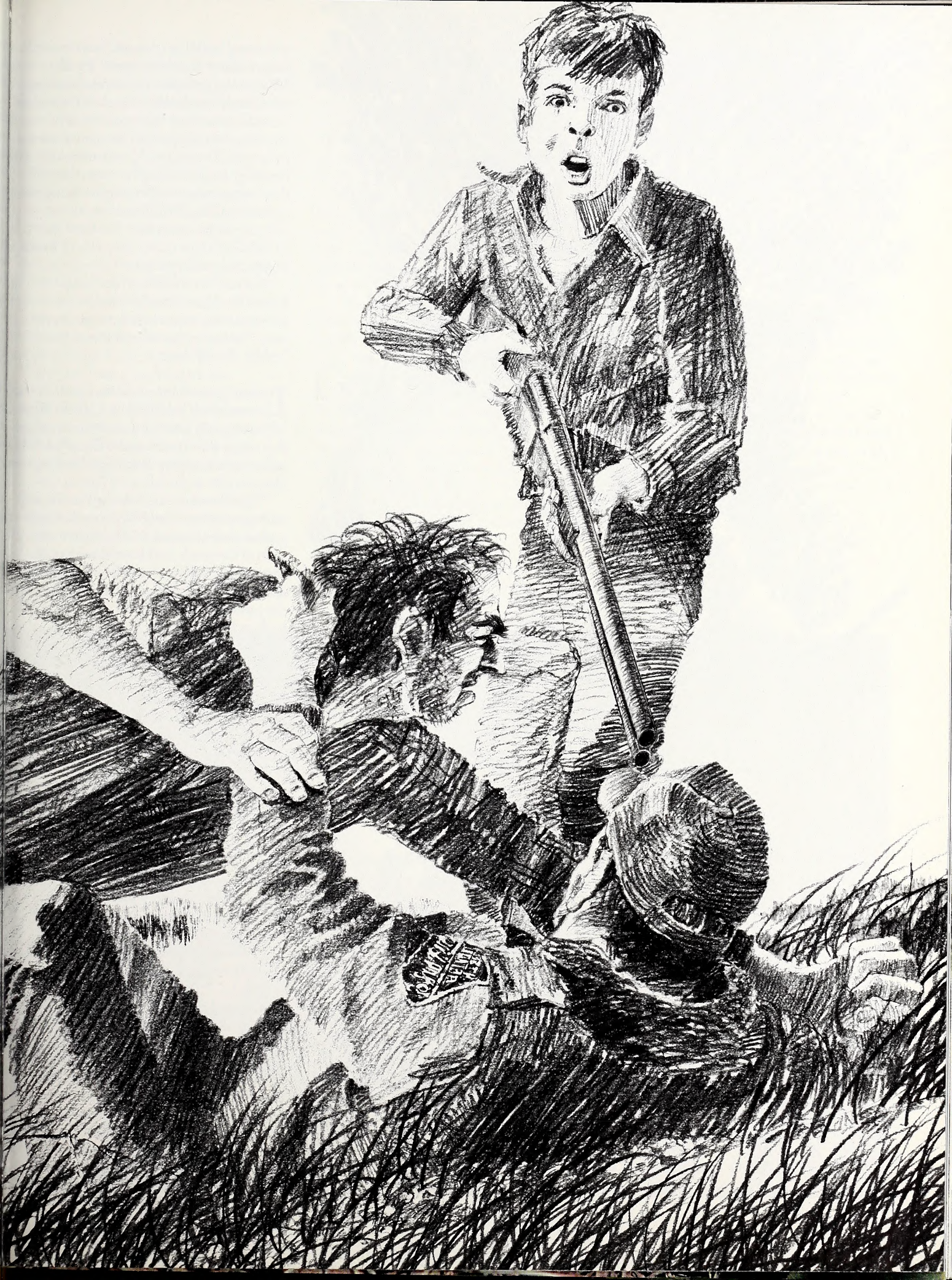
by Mark Taylor

It looks like the perfect job. You spend most of your time outdoors, get to talk hunting and fishing nonstop, and spend your days stocking trout or befriending cute, orphaned fawns.

This is the public's perception of the job of wildlife enforcement officer — sort of a blend of a professional sportsman and Timmy's dad from the old *Lassie* television series.

The reality is far different. Most wildlife enforcement officers love their jobs, but there is a dark side and very little resemblance to the popular prototype. Not everyone in the outdoors looks or acts as though they just stepped out of the pages of an L.L. Bean catalogue, and chances are good that sooner or later an officer will confront a band of drunken hooligans on a lonely stretch of road who would just as soon kill him as not. And very well might. In fact, a national study done by the University of Wyoming shows that wildlife work is one of the most dangerous fields of enforcement. Wildlife officers aren't assaulted as often as regular police, but when an assault occurs it's nine times more likely to be fatal. In addition, officers face the same risks from bad weather and accidental injury as anyone else who works alone outdoors.

"You try not to dwell on the dangers of the job," said Major Ray Johnson, who supervises the selection and training of officers for the N.C. Wildlife Resources Commission. In addition, Johnson is also the agency's chief pilot. "All enforcement people live day to day



**"One of the men ran to the house to get a gun while the other tried to drag the tub to the door."**

with the possibility of death, but it's a little more evident in wildlife work. It's also difficult to catalogue the situations where there might be trouble. A look at the assault records shows that violence is usually random and unexpected. You can do everything right for years and just be unlucky. On the other hand, many officers go through their entire careers without ever facing any serious trouble. Wildlife enforcement officers see people at their best and worst. In addition to the close calls, a lot of funny things happen on the job."

Any veteran wildlife officer has a repertoire of good stories, and we've selected a few at random from across the state. Here are a few tales of life on the "rabbit sheriff" beat.

It's not unusual for a routine patrol to end as something far different. Officer Travis Whitson of Bryson City recalls an incident that occurred when he and officer Rick Wells were checking some illegal deer hunting near Waynesville in the fall of 1978.

"We drove up a logging road in our jeep, and approached a large farm truck which had no doors," he said. "There were two men in the truck, and I could see a trail through the leaves where they'd dragged a deer. I got out and approached the man on the passenger side. When I asked if I could look in the back of the truck, he grabbed a 30-30 rifle and said, "Hell, no. Lay a finger on this truck and I'll blow it off."

Whitson was attempting to arrest the man when the driver came up behind him and swung at his head with the barrel of a Browning shotgun.

"Fortunately, he missed and hit me across the forearms," Whitson recalled. "Then, I tried to get the shotgun away from him while Rick Wells covered the guy with the 30-30. We had the shotgun diagonally across our stomachs, but the guy refused to let go. Finally, I drew my revolver and said 'you're going to let go of this gun.' There were a couple of kids with the men, and a boy of about 14 came over and took the shotgun from the man."

Whitson's troubles weren't over, however. As he holstered his revolver, the man grabbed it. "The gun went off, and it was so close that the guy got powder burns on his shirt. I tried to arrest and handcuff him, and he resisted. We ended up struggling in the ditch. The man started hollering at the boy to pull me off, and threatened him if he didn't. I told the boy to stay put. Then, the man hollered at the boy to 'blow my damn brains out.' The next thing I knew the boy was holding the muzzle of the shotgun against my head. He was also crying and becoming hysterical because the man was

till threatening him, and he didn't know vhat to do. At that point, the boy was more langerous than either of the two men. Rick nd I backed off and radioed the sheriff's lepartment for help. Our jeep blocked the oad, and things had calmed down by the ime help arrived.

"The men were arrested without incident, nd later found guilty of serious assault harges and doe-deer violations. I've never ad anything like this happen before r since."

An experience that officer Rick Venable f Almond had on Big Snowbird Creek in Graham County near Robbinsville ended n a happier note, and also earned him the nviable reputation as being one of the leetest officers in the mountains.

"I had just begun working for the Commission, and was patrolling with officer Lincoln Long," said Venable. "We drove up road along the creek and saw two guys rout fishing. We stopped to check their censes, but by the time we got to the creek hey were gone."

The officers spotted the men running hrough the woods and hollered at them to top. They didn't. Venable waded the creek nd hit the bank running.

"The guys had about a 40 yard head start, but were still carrying their fishing rods," he said. "They kept tripping over the rods and lines. Finally, one of them fell and the other tripped over him. I thought I had them, but sure enough I fell in the same spot. They took off again, and I managed to collar one. The other hit the creek and was debating on whether to wade it. I eased down and got him too."

Neither of the embarassed young men had a fishing license. When asked why they neglected this important item they replied that "We didn't think we needed one — we figured we could outrun any game warden we saw."

"We asked what had given them this absurd idea," Venable chuckled, "and they said they were both college quarterbacks."

Growing deer populations have been a blessing to North Carolina sportsmen, but they pose some special problems for wildlife enforcement officers. Working fire-lighting details is considered the most hazardous duty that officers routinely undertake. Officer Richard Stowe of Bakersville recalls an incident in which he and Fred Wilkie confronted a lone gunman in Wilkes County one winter night in 1977.

"We were parked behind a church watching for fire-lighters," he recalled. "A car cruised down the road and pulled into the driveway. We were both outside our car, and hid in the graveyard behind the church. Suddenly, I saw a man with a shotgun standing in the graveyard looking for deer. I stepped out from behind a tombstone, turned on my flashlight, and identified myself as a state wildlife officer. I then asked who he was and what he was doing.

"The man replied, 'Who are you, and what are you doing?' I identified myself again as a wildlife officer and asked who he was and whether he lived in some trailers nearby. I got the same response. I identified myself once more and turned the light on Fred so he could see the uniform. Suddenly, he turned and went back to his car."

Stowe and Wilkie followed, and as the car pulled out of the driveway Stowe heard Wilkie say 'look out — there's a man with a gun running back here.' The driver of the vehicle, who had not been in the graveyard, had returned.

"Our car was parked about three feet

**Wilkie ordered the man to throw down his gun. The man replied, "Throw down yours."**

*Illustrations by Walt Obman*

**"The plane kept shaking. I looked out the window, and the right wheel was spinning out at the tip of the axle."**

from the back wall of the church, and Fred was between the car and the wall when a man with a double-barrelled shotgun spun around the corner," said Stowe. "I was still on the other side of the car. He and Fred were about five feet from each other, and he had the shotgun pointed at Fred's chest. Fred had his revolver drawn, and neither man moved."

Wilkie ordered the man to throw down his gun. The man replied, "Throw down yours."

"Fred repeated his command two or three times, and the man gave the same reply," Stowe added. "I had my revolver drawn, but couldn't do anything because the men were so close. If anyone had fired, muscle reflexes on the triggers probably would have killed both of them. When the man kept refusing to throw down his gun, I turned on my flashlight and told him twice to drop it. Up to that time, he hadn't seen me. He hesitated a little, and lowered his shotgun from Fred's chest to his stomach. Then, he flicked the safety on and off four or five times real quick as he tried to decide what to do. He kept his gun on Fred, and suddenly he pivoted back around the corner and was gone. We followed their vehicle. When they saw they couldn't lose us they stopped in a well-lit area and we made the arrests."

Even a dangerous situation sometimes has a comic side. Joe Newman, an officer now stationed in Kinston, recalls a case that occurred when he arrested a man for illegally killing a doe deer in Brunswick County.

"I'd been driving through the country with a friend in his personal car when we saw two men carrying a skinned doe in a washtub from a shed to their trailer," he said. "I jumped out of the car and ran over to them while my friend drove down the road to get help. One of the men ran to the house to get a gun while the other tried to drag the tub to the door. He was still waving his butcher knife around, and the only way I could stop him was to draw my revolver and stand in the tub while he circled me with the knife. We went round and round, and I still had one foot in the tub when the highway patrol arrived."

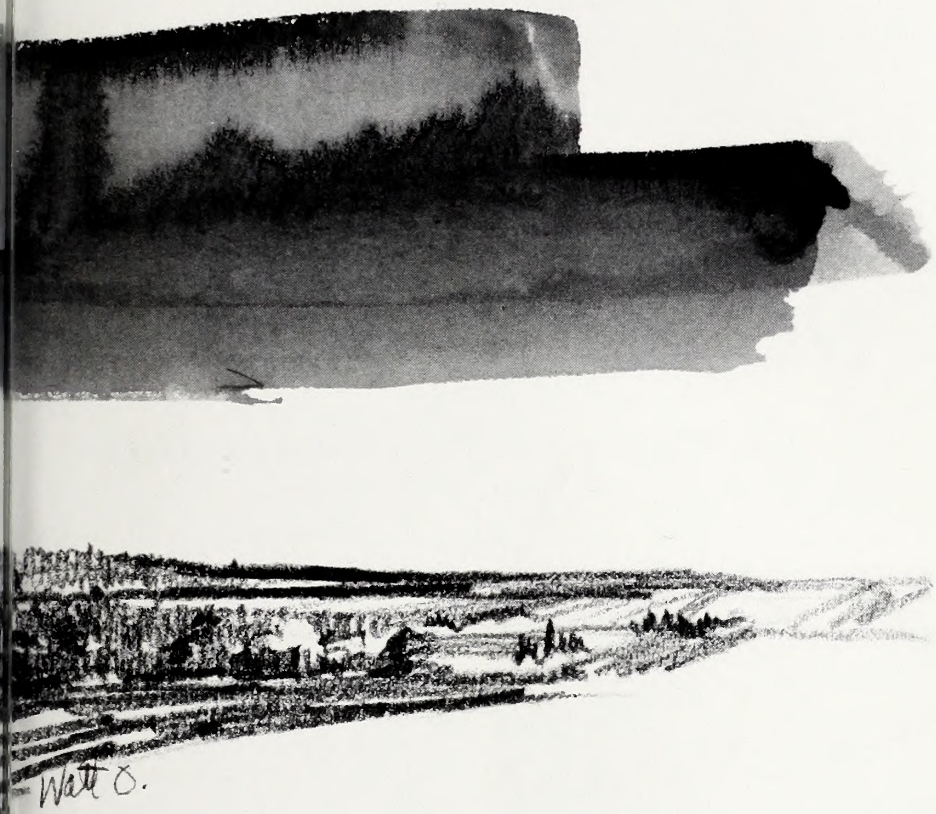
Assaults aren't the only dangers facing wildlife enforcement officers. An accident in a remote area can have dire consequences to a man working alone.

Mike Zetts is now stationed in Raleigh, but in the spring of 1977 while working in Macon County he was almost killed by his own boat.

"I was checking fishermen on Nantahala Lake when a pair of binoculars fell off the boat's dashboard," he said. "I reached down to get them, and they slid out of reach behind the seat. So, I stretched way back to reach them and the next thing I knew I was in the water."

Zetts had momentarily let go of the wheel, and a defect in the steering mechanism caused the motor to swing violently to one side. "It happened so quick it was unbelievable," he said. "One minute I was in my boat, and the next thing I knew I was sitting in the water. The boat was locked in a tight circle with the stern swinging out and was going really fast. I was in the center of the circle.

"I knew I had to get out of the circle, so I swam as hard as I could. I could hear the boat bearing down on me, and looked up and saw it coming. I felt like I was taking my last look at life. I knew that if I didn't kick off the stern the boat would cut me in half. When it swung around, I kicked off the transom and heard the motor hesitate for



n instant."

The boat was making another circle, and Zetts swam a few more hard strokes. "I knew something was wrong because my left leg wasn't working the way it should. The boat missed me by a few inches on the second pass, and more on the third. I knew then that I had the boat beat. However, fatigue and cold water had taken their toll and I began to see yellow blotches in front of my eyes. I thought I was going to pass out and drown. Finally, I hit shore. I crawled up on some rocks, and my left leg and boot were soaked in blood."

The noise that Zetts had heard was the prop hitting below and behind his left knee. Some fishermen that Zetts had checked picked him up, treated him for shock, and took him to a hospital. Ultimately, 50 stitches were needed to close his wound.

"Fortunately, the prop didn't hit any tendons so I have no problems walking or running," he said. "I was really lucky. It's also a good thing those fishermen came by because when I hit land I was probably 20 miles from the nearest phone. I'd have died of exposure or loss of blood for sure. As a result of this accident, all Wildlife Commission boats are now equipped with kill switches and personnel are required to wear life jackets at all times."

Sterling Baker of Burlington has now been a wildlife officer for 25 years. Yet, every time he checks a hunter he remembers what happened to him on December 10, 1964.

"I was checking some illegal doe hunting in a thick, cutover area in Bladen County, and could hear a man calling his dogs," he said. "I worked towards him, but he quit calling so I stopped. I got up on a stump to get a better look over the brush, but couldn't see him. So, I got down and stood by a sapling. When I moved he fired. He was about 40 yards away."

The first shot hit Baker in the stomach and doubled him over. The second caught him in the left shoulder.

"I felt a real burning sensation when I was hit, and hollered for help. The man who'd shot me came over. He and his brother rigged a makeshift stretcher and carried me to the hospital in Elizabethtown.

"It was four months before I went back to work. I took a total of 10 double 0 buckshot pellets in the stomach, chest and shoulder. The shooting could be termed accidental. I term it 'stupid' because the man was shooting at anything that moved. Although I've never been shot at intentionally or seriously assaulted, this incident has never really left me. I still think about it every time I step into the woods."

As chief pilot for the Wildlife Commission, Ray Johnson has logged thousands of hours in the air. Planes are used extensively for fire-lighting details and also to coordinate teams of officers on the ground who are checking dove hunters, fishermen and boaters.

One day, Johnson was testing a plane after a routine 100-hour inspection. The plane was fairly old and new tires weren't available so retreads were used. The tires weren't perfectly balanced, and after takeoff the plane would shake. Johnson had gotten into the habit of touching the brakes right after take-off to stop the wheels from spinning.

"When I touched the brake on this occasion nothing happened," he said. "The plane kept shaking. I looked out the window, and the right wheel was spinning out at the tip of the axle."

Johnson got on the radio, and called the mechanic who'd worked on the plane.

"I said 'I've got a problem — the wheel is coming off.' There was total radio silence. Then, in a real quiet voice the mechanic said 'You are still on the ground aren't you?'

"I said I wasn't, and no one said a word. I knew that when I landed the axle would dig into the runway and flip the plane if the wheel came off. So, I came in as slowly as I could and cut the gas over the end of the runway. Then, I landed on the good wheel and kept the other off the ground as long as I could. When the bad wheel finally touched down it stayed on the landing gear."

What had happened? "The mechanic had been interrupted by a phone call and forgotten to put a locking pin back on the wheel nut," said Johnson. "He was a really good mechanic, and felt terrible. I never mentioned this incident to him."

Some of the funniest 'game warden stories' concern excuses for violations, and Stephen King at his best could not top them for inventiveness. One of my favorites comes from Mike Zetts, who had checked a bank fisherman on Nantahala Lake. At that time there was a size limit on pike, and he spotted a fish on a stringer at the man's feet that looked a little bit on the puny side of legal.

"I guess that's your fish," Zetts said to the angler.

"Not exactly," the angler replied.

"Looks a little small to me," Zetts said.

"Yeah, he probably is," said the angler. "I caught that rascal three or four times. He finally bothered me so much that I had to tie him up just so I could fish in peace." ⊠

# Saving Secret Spots

*The Nature Conservancy kicks off its $2 million "Conserve Carolina" drive to save and protect North Carolina's dwindling natural areas.*

Frederick Annand

***The Cooley's meadowrue*** (Thalictrum cooleyi) *at Lanier Quarry Savannah in Pender County is considered globally endangered, and is found at only five other sites that are all within a two mile radius of this spot. This unique natural area is threatened by residential development and limestone mining. Bat Cave in Henderson County (right) harbors the federally endangered Indiana Bat, and also hosts four potentially new species of invertebrates.*

*by Mark Taylor*

Almost everyone had a special spot as a kid, a secret place that they never told anyone about. Mine was on a hilltop under a gnarled, old apple tree that shaded a grassy, granite ledge and formed a cool, green cave hidden from the outside world. It was the kind of place where a 12-year-old boy could steal away for a whole summer afternoon.

I visited my secret spot recently after an absence of many years. The hill wasn't as high as I remembered, and the meadow had shrunk. Roads subdivided the area, and a new vacation home stood squarely on the spot where my hideaway had been.

The changes didn't really surprise me, but I felt sad all the same. Over time, the scale of my secret spots had grown to encompass entire ecosystems. However, the sight of a mountain stream running blood red with silt or a coastal marsh being filled for waterfront condos still kindles the same feelings. And along with the sadness comes a question: can't we save at least some of what's best of our natural world?

Fortunately, the answer is yes. There's a nonprofit organization called the North Carolina Nature Conservancy that does one thing and does it better than anyone else—save wild areas. How? Sometimes land is donated, but generally the Conservancy buys it using funds contributed by individuals, companies and foundations. These unique natural areas are then usually transferred to public ownership. Not all lands can be considered for preservation, so the Conservancy concentrates on those lands having irreplaceable natural values. Recently, the Conservancy kicked off a $2 million fund-raising drive called "Conserve Carolina" that will help preserve the best of North Carolina's natural heritage.

"In 1982, we began developing long-range plans that led to this campaign," said William deBuys, executive director of the Conservancy. "We found we had several critical needs. First, we needed to complete the land acquisition required to protect the core of our system of 21 nature reserves, which encompass about 24,000 acres. This involves seven land-protection projects. We also needed funds to manage and protect these areas. In addition we found that we needed to develop a funding mechanism that would enable us to respond rapidly when valuable natural areas go up for sale."

The lion's share of the fund—$1.25 million—will be used for land acquisition at the following reserves:

- Nags Head Woods in Dare County is one of the best remaining examples of a maritime forest on the East Coast, and $500,000 is needed to acquire several key holdings that will complete this $2.5 million project. This forest is threatened by residential development.
- The Lanier Quarry Savannah in Pender County harbors numerous endangered plants, and only 37 of its 125 acres are

Frederick Annand

***Camassia slopes** on the Roanoke River (right) is a 176-acre tract covered with camassia and other rare wildflowers. This area was donated to the N.C. Nature Conservancy by Union Camp Corporation. Efforts are underway to acquire other unique areas on the Roanoke River. Bluff Mountain in Ashe County (below) includes 14 of the 15 major plant communities of the southern Appalachians, and over 500 species of flowering herbs and shrubs grace its slopes.*

Michael Godfrey

protected. The area is threatened by residential development and limestone mining, and $75,000 is needed for land acquisition. Two globally endangered plants — Cooley's meadowrue and Carolina grass-of-parnassus — are found on the site. Another plant recently discovered — the nodding onion — may be a new species.

• The Green Swamp in southeastern North Carolina is known for its 14 species of carnivorous plants, and a high priority has been placed on acquiring the Big Island Savannah — a 100-acre tract adjacent to the 13,850 acre reserve. Botanists have found over 50 species of plants per square meter in Big Island Savannah — a level of diversity unequalled in the world. Fortunately, Federal Paper Board has indicated its willingness to donate the Big Island Savannah when financial conditions permit. This company donated the original tract to The Conservancy.

• Carolina bays are elliptically shaped wetlands that dot the Coastal Plain. Many unusual and threatened plants are found in these wetlands which are also the last strongholds for black bears in southeastern North Carolina. In recent years many Carolina bays have been cleared, drained and converted to farm land. The Conservancy has acquired portions of nine Carolina bays, and $125,000 is needed for land acquisition to complete the system.

• Bat Cave in Henderson County is believed to be the largest granite-fissure cave in the world, and is also home to the federally endangered Indiana bat. Four new species of invertebrates have also been found in the cave. The Conservancy owns a quarter interest in the 93-acre site, and $50,000 is needed to permanently protect and manage the area.

• Bluff Mountain in Ashe County is a botanist's dream, and 14 of the 15 plant communities of the southern Appalachians are found on its slopes. Over 500 species of

Frederick Annand

flowering herbs and shrubs are also found on the 758-acre site. Additional land acquisition and development of an education center will cost $150,000.

• The Roanoke River is bordered by some of the finest bottomland hardwood forests in the Southeast, and $250,000 is earmarked for their protection. A major step in this direction was made recently when the Nature Conservancy acquired several key parcels from Allegheny International and sold them to the N.C. Wildlife Resources Commission (many lands acquired by the Conservancy are eventually transferred to state or federal natural resource agencies). However, in cooperation with the N.C. Natural Heritage program the Conservancy has identified 20 sites along the river exemplifying the best bottomland habitats for future protection. Much of the land along the Roanoke River is being cleared and converted to farm land or sycamore plantations.

The second phase of "Conserve Carolina" is the development of a revolving Land Protection Fund. This fund would be used to finance land acquisition, and $750,000 will be maintained in the fund for this purpose.

"The Land Protection Fund would work much like a bank," said deBuys. "When we need to buy land, we will borrow from this fund and then pay back the loan over a long period of time with interest. The interest would support the management of our reserves. This would enable us to act quickly when land is put up for sale, and that is essential."

The "Conserve Carolina" campaign has received strong support from philanthropic foundations and North Carolina businesses and industries—approximately $1.3 million has already been donated or pledged to the campaign by the Knapp Foundation, Z. Smith Reynolds Foundation, R. J. Reynolds Company, H. Smith Richardson Charitable Trust, First Union Corporation, Wachovia Bank and Trust Company, Burroughs Wellcome Company, Bluementhal Foundation, Biltmore Company, trustees of the N.C. Nature Conservancy, and others.

"We've been very pleased with the response from foundations and North Carolina businesses," said deBuys. "However, we need help from individuals as well. When people hear that we've gotten a big grant, they often wonder why we need their $20 donation. There are several reasons. First, we have over 6,000 members in North Carolina and a lot of small donations add up. Another reason is that many worthwhile causes are competing for grant money and corporate contributions. One of the first questions these institutions ask is whether there is strong public support for the program. Therefore, the significance of an individual's contribution goes far beyond its monetary value."

***Big Island Savannah*** *adjoins the Green Swamp, and botanists have found an astonishing 50 plant species per square meter in this area.*

The Conservancy's efforts to save wild areas won't end with the "Conserve Carolina" campaign. The organization is now developing new plans that will set priorities for preservation of natural areas in the future.

"Our 400th anniversary celebration has given North Carolinians a lot to think about," said deBuys. "For the past four centuries, we've been altering or destroying our wild lands—and we're just coming to the end of that process now. There's tremendous pressure on natural areas throughout the state from residential and industrial development, forestry, agriculture and a host of other activities. We've got 10 or 15 years at the most to look at the remaining wild areas that aren't protected and decide their fate. If we don't take the steps necessary to preserve these areas soon, they'll be lost for good."

Information on "Conserve Carolina" is available from the North Carolina Nature Conservancy, P.O. Box 805, Chapel Hill, NC 27514. ⊠

# WILDLIFE BY THE NUMBERS

**What are the trends for rabbits, deer, ducks and other game species, and how many hunters are seeking them? Annual mail surveys give biologists the information they need to plan research and management.**

by Terry Sharpe

Of what possible value would it be to know that there are 176,783 deer hunters in North Carolina? Or 153,462 squirrel hunters, or 112,653 rabbit hunters, or 70,121 quail hunters? For that matter, why would anyone want to know that 1,407,750 squirrels were harvested in North Carolina last year?

On a more personal level, why would I be expected to understand such information when I can hardly recall how old my kids are, or the date of my wife's birthday? The answer is not really a mystery to anyone who knows a little about the management of wildlife populations. In some ways, it's a numbers game, and as a wildlife biologist, I know that accurate figures on the numbers of hunters and the game they harvest can be a vital part of any wildlife management plan.

Like any business, the North Carolina Wildlife Resources Commission needs to be aware of the changing interests and needs of its customers (hunters). If the number of deer hunters is growing — which it is — then that fact is useful to wildlife managers in planning for the future. Keeping track of numbers is also important in determining trends in game populations. For example, the rather long-term decline in rabbit populations shows up in annual harvest figures, and that information has sparked research and management programs to find ways to rebuild populations.

The least expensive and perhaps most reliable method of obtaining "numbers" you can trust is through mail surveys, which is why the Wildlife Commission's Division of Wildlife Management conducts these surveys. Interpreting those numbers is the real key, and to get a better understanding of how such surveys work, I visited Dave Turner, a researcher with the Southeastern Cooperative Statistics Project at N.C. State University. He and his associates prepare the mail surveys used by the Commission. Turner explained that mail surveys are somewhat like automobiles — you simply need to understand the basics in order to use them.

Perhaps it's just human nature, but most folks who haven't worked with surveys tend to mistrust the results. That's where a math whiz with an understanding of statistics can come in handy. People like Turner design, test and fine tune the techniques that the Wildlife Commission and other wildlife agencies use to sample hunters. Through experience and mathematical analysis, Turner's outfit can even predict the degree of faith one can place on the results, and a well-designed survey can be trusted to give reliable information on trends.

The 1983-84 survey was conducted by biologist Carl Betsill of the Division of Wildlife Management and Dave Turner from the Southeastern Cooperative Statistics Project. Carl and Dave first figured out the number of hunters in the various categories — about 350,000 individuals. Then Dave determined the number of contacts necessary for accuracy, and Carl balanced that figure against our budget to arrive at a sample size of two percent of the hunters. Reports were received from about 4,000 hunters after three mailings.

The questions asked are those often heard around the country store during the fall and winter months. What did ya get? How many times did ya hunt? Where did ya hunt? However, questions on where you hunted were restricted to the Mountains, Piedmont, or Coastal Plain. (We didn't really need to know the exact location of your secret spots). Finally, the survey was mailed soon after the conclusion of the 1984-85 season because experience shows that the more time that has passed since the hunt, the heavier the game pouch tends to become.

In evaluating the trends, I first looked at the changes that had occurred in the species hunters seek most often. I found that North Carolina's population of deer hunters has been growing steadily while the number of hunters who seek rabbits, squirrels, and quail has been steadily declining. Not surprisingly, these trends reflected changes in my own hunting career. When I was growing up in Piedmont North Carolina, I hunted squirrels, quail, and rabbits near my home extensively, but as quail and rabbits became more difficult to locate and deer invaded the community I spend less and less time chasing small game and more time hunting deer. In the late 1960s, my dad's last good setter died and deer hunting became a full time winter avocation. That's apparently been fairly typical of many hunters.

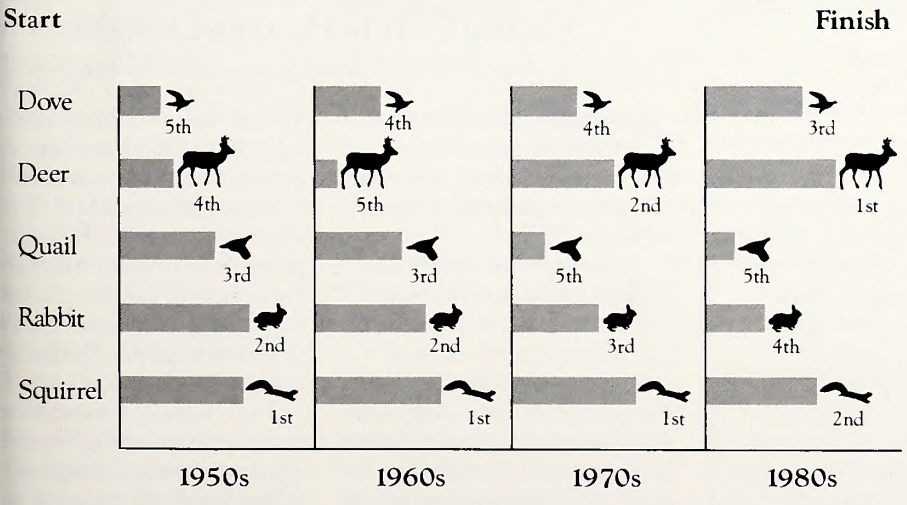
Statewide, deer climbed from the fifth most popular game species in 1964 to number one in 1983. Squirrel hunters, who made up the largest segment of our hunting population since mail surveys were begun in the late 1940s, were finally outnumbered by deer hunters.

Some trends in the survey have a biological basis, while other changes can be traced to social changes such as hunter preference, and some overlap. Increases in deer hunters are certainly due primarily to the expansion of our deer herd. However, most biologists agree that squirrel populations fluctuate in

# 1983-84 Harvest Mail Survey Excerpts

| Species | Area | Number Of Hunters | Hunting Trips | Harvest |
|---|---|---|---|---|
| Dove | Coastal | 49,903 | 243,004 | 1,116,440 |
| Dove | Piedmont | 63,617 | 280,229 | 1,162,560 |
| Dove | Mountains | 9,351 | 31,376 | 95,473 |
| Dove | Statewide | 120,281 | 567,758 | 2,397,260 |
| Ducks | Coastal | 24,898 | 139,265 | 178,661 |
| Ducks | Piedmont | 10,393 | 58,517 | 68,895 |
| Ducks | Mountains | 1,688 | 6,731 | 4,882 |
| Ducks | Statewide | 34,770 | 204,649 | 254,036 |
| Quail | Coastal | 31,889 | 214,480 | 483,463 |
| Quail | Piedmont | 32,930 | 192,944 | 300,358 |
| Quail | Mountains | 9,594 | 50,728 | 20,237 |
| Quail | Statewide | 70,120 | 469,803 | 816,204 |
| Rabbit | Coastal | 40,786 | 283,877 | 279,050 |
| Rabbit | Piedmont | 53,208 | 341,156 | 308,349 |
| Rabbit | Mountains | 21,635 | 127,313 | 104,250 |
| Rabbit | Statewide | 112,653 | 761,869 | 707,892 |
| Raccoon | Coastal | 17,790 | 188,927 | 131,080 |
| Raccoon | Piedmont | 11,767 | 143,516 | 89,167 |
| Raccoon | Mountains | 7,684 | 102,493 | 35,902 |
| Raccoon | Statewide | 35,269 | 438,773 | 262,555 |
| Squirrel | Coastal | 54,947 | 403,691 | 487,099 |
| Squirrel | Piedmont | 65,824 | 435,671 | 550,272 |
| Squirrel | Mountains | 34,680 | 242,797 | 335,012 |
| Squirrel | Statewide | 153,462 | 1,098,070 | 1,407,750 |
| Deer | Coastal | 77,256 | 1,066,260 | 60,378 |
| Deer | Piedmont | 67,830 | 713,719 | 20,571 |
| Deer | Mountains | 49,152 | 354,561 | 11,827 |
| Deer | Statewide | 176,783 | 2,162,950 | 96,236 |

# Changing Popularity Of Hunting Species




The habits of North Carolina's hunters are changing. In the 1980s, for the first time, there are more hunters pursuing deer than small game.

relation to mast crops. Though some habitat loss is occurring, no long-term decline in squirrel populations can account for the drop in the number of squirrel hunters. Therefore, it's the increase in deer — a more glamorous animal to many hunters — that has caused many squirrel hunters to switch to big-game hunting.

On the other hand, a population decline in both rabbits and quail has been noted throughout the Eastern United States, and lower game populations, coupled with less access to hunting areas, are mirrored in the mail survey results. North Carolina's quail and rabbit hunters have both declined in numbers over 50 percent since the early 1970s. Even so, some information tends to question whether the good old days were really all that great. For example, the number of quail and rabbits harvested per hour was admittedly low in 1983-84, but still comparable to some of the lean years during the 1960s and 70s which indicates that today's hunter is working harder or selecting better hunting locations.

The mail survey, as presently designed, has less value in estimating harvest trends for many game species which are pursued by only small numbers of hunters. Data concerning goose, turkey, bear and boar hunters must be viewed with caution because the statistical sample is small. However, trends confirm that hunters pursuing raccoon, grouse, and ducks have increased.

One other factor is clear. The future challenges of game management are reflected by those mail surveys. Waterfowl is a prime example. There are more hunters, yet there are also lower waterfowl populations due to a combination of habitat loss, weather, excessive harvest (in some cases), and more competition for access to prime areas. The message is plain — something has got to give, and waterfowl hunters may be among the first to face increasing restrictions to ensure that an adequate number of birds are returned to breeding grounds.

Since North Carolina's mail surveys are scheduled on a three-year cycle, the next one is planned at the completion of the 1986-87 hunting season. It will be interesting for biologists and sportsmen to compare that survey with this one, and also all previous ones. The importance of these surveys will surely increase as pressure grows to balance hunter populations with game resources while habitat continues to dwindle.

Accompanying this article are excerpts from the most recent hunter mail survey, and also information showing the changing popularity of the top five game species in North Carolina during the past four decades. ⊠

*Habitat Is Top Priority*

## Quail Unlimited Groups Organize In North Carolina

*Written and Edited by Mark Taylor*

There's strength in numbers. Duck hunters learned this lesson a long time ago, and banded together through such organizations as Ducks Unlimited to protect and improve waterfowl habitat. Now, quail hunters in North Carolina are doing the same thing through an organization known as Quail Unlimited.

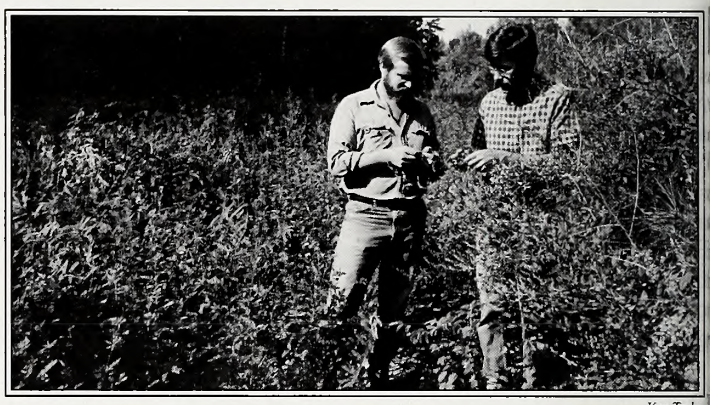
Quail Unlimited is modeled on DU, and the new organization has organized chapters in Sanford, Rockingham, Jacksonville, Smithfield and Lenoir. New chapters are also being formed in other areas.

"The local chapters are involved in a wide range of projects," said Mark Patterson, habitat chairman for the Sanford Chapter of QU. "Annual fund raising banquets, similar to Ducks Unlimited's highly successful fund raisers, are hosted by each chapter. To date, four of these have been held across the state. Funds from these banquets are contributed to the Wildlife Commission, and are used for quail management and research. Chapters also work to improve quail habitat in their areas. Our chapter, for example, has helped plant lespedeza on several thousand acres of cutovers on paper company lands. Also, about half of our effort has been put into management work on the Shearon Harris and B. Everett Jordan game lands. All told, our chapter has planted about 140 units of perennial wildlife seed and three times as much lespedeza this year."

Other chapters are involved in different projects. The Lenoir Chapter, for example, has donated three copies of the film *Counting On Quail* to the N.C. Wildlife Resources Commission. This film emphasizes the need for habitat management.

"Quail Unlimited has the potential to do a lot of good in North Carolina," said Terry Sharpe, small game project leader for the N.C. Wildlife Resources Commission. "One of the best things that can be done to improve quail populations is to improve habitat through controlled burns, thinnings of forest stands, management of native vegetation, planting of seed plots, and other activities. Local chapters can give us a lot of help in these activities, and can also make landowners more aware of the need for sound quail management on their lands."

Information on local chapters is available from Quail Unlimited, Box 10041, Augusta, Georgia 30903.



Ken Taylor

***Sowing A Future:*** *Quail Unlimited is working with the Wildlife Commission to improve habitat for quail on public lands. Here, Mark Patterson of the Sanford Chapter (left), and Terry Sharpe, Wildlife Commission small-game project leader, inspect a food plot on the Shearon Harris Game Land.*

*Use Your VISA Or MasterCard*

## Lifetime Licenses Can Be Charged

If you've ever wanted to buy a lifetime hunting and fishing license—or a lifetime subscription to *Wildlife In North Carolina* magazine—and thought you couldn't afford it, wait no more. The N.C. Wildlife Resources Commission is now accepting MasterCard and VISA payments for these items, allowing the cost to be budgeted over a period of time. A lifetime license or lifetime magazine subscription is still a real bargain when you consider it will pay for itself in only a few years.

Applications for lifetime licenses are available from license agents, Wildlife Commission employees, or the License Section, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.

*Reduces Disease Risk*

## Eating Fish Is Heart's Delight

Any angler will tell you that fishing is good for the soul. Now, there's evidence that eating your catch is also good for the body.

A recent article in the *New England Journal of Medicine* notes that eating fish regularly may reduce the risk of heart disease considerably. Dr. Dean Kromhout and his colleagues at the University of Leiden in the Netherlands monitored the health and fish consumption of 852 middle-aged Dutch men over a 20-year period. They found that mortality from coronary heart disease was over 50 percent lower among subjects who consumed an average of an ounce of fish daily compared to those who never ate fish. While researchers were unable to explain the link between fish and better health, they speculated that fish oil may cause blood to clot more slowly and reduce fat levels in fish and man.

The researchers recommend that people include fish in their diets once or twice a week—adding that heart disease is also rare among the Eskimos and Japanese, who eat large amounts of fish.

*Write For Free Copy*

## "Crisis In Habitat" Reprints Available

Reprints of "The Crisis in Habitat," the four-part series appearing in *Wildlife In North Carolina* last year, are available free from the N.C. Wildlife Resources Commission. The series, written by associate editor Lawrence S. Earley, examined wildlife habitat throughout the state and some of the issues facing landowners, government officials and voters.

The first article in the series examined Bladen County's Carolina bays and their black bear population. Many of the bays — densely vegetated wetland areas - were converted to row crops of soybeans and corn during the booming land market of the 1970s and early 1980s. Black bears are more vulnerable today as a result.

The Piedmont was the focus of the second article, expecially the changes in the rural areas where urbanization is putting pressure on farmland and rural customs such as hunting. The third article pointed out that although private landowners own over 14 million of the state's 19 million acres of woodland, relatively few are managing their land for wildlife. The last article presented various solutions to the problems of habitat loss, and focused on private citizens who were making these solutions work.

"Crisis in Habitat" has drawn wide attention both in this state and throughout the country. "The message contained in this series is an important one for North Carolina," said A. Sidney Baynes, chief of the Division of Conservation Education. "Conservation is a matter of choice, and the articles clearly identify where choices can be made. We want to put this booklet in the hands where it will do the most good."

Free copies can be ordered by writing: "Crisis in Habitat," Division of Conservation Education, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.

*Donated By Wild Turkey Federation*

## New All-Terrain Vehicle Gets Turkey Program Rolling

Wildlife biologists will find it a little easier to keep track of the state's wild turkey population thanks to a generous gift from the North Carolina Wild Turkey Federation. The state chapter of the Federation, along with the National Wild Turkey Federation, recently donated a Suzuki Quadrunner all-terrain vehicle and trailer to the Wildlife Commission for its wild turkey research and management program.

The vehicle was purchased by the North Carolina Wild Turkey Federation with revenues from its Research and Development Fund. This fund is supported by proceeds from the North Carolina chapter banquet in Charlotte (see Calendar of Events). In addition, approximately $4,800 from this fund will be used to support a study of wild turkeys.

"The major purpose of the Research and Development Fund is to help the Wildlife Resources Commission with its wild turkey program," said John Carriker, president of the North Carolina Wild Turkey Federation. "We want to be sure that the Commission has the equipment and supplies needed to trap and relocate wild turkeys so that all the suitable habitat for the birds in the state will eventually be occupied."

The research funds will support a three-year study of the effects of flooding on wild turkey populations in the Roanoke River beginning this spring. This study, which will be conducted by the Department of Zoology of N.C. State University, will examine the effects of flooding on turkey nesting, reproductive success, and survival. In the course of this study, the Suzuki Quadrunner will get its first workout. Access to many of the lands along the Roanoke River is difficult during periods of high water, and the vehicle will help biologists get into low areas where they will live-trap wild turkeys and fit them with radio transmitters.

"We're very grateful to the N.C. Wild Turkey Federation and the Charlotte chapter's banquet committee for their generous support," said Brian Hyder, leader of the Wildlife Commission's wild turkey project. "The Federation members have been extremely industrious in establishing this research and development fund, and they've provided the wild turkey program with a lot of funding and equipment. This new vehicle will be instrumental in giving us access to swamp forests in eastern North Carolina as well as to some of our more remote mountain habitats."

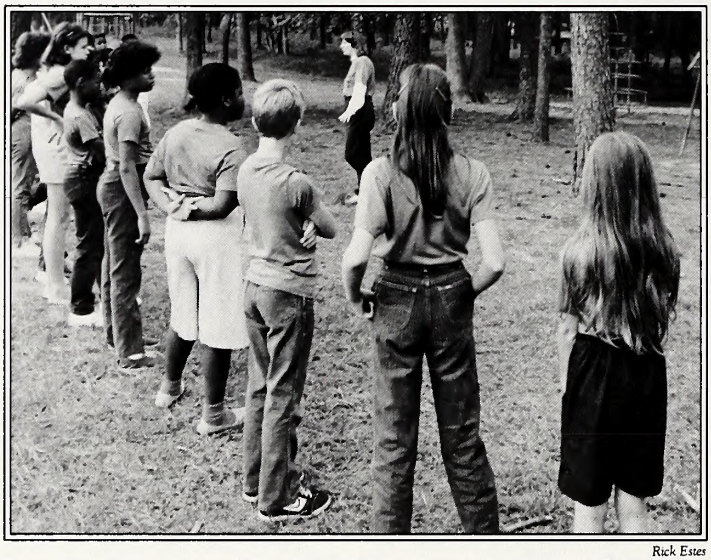
*— Jane Rohling*

Jane Rohling

***New Wheels:*** *The North Carolina Wild Turkey Federation recently donated an all-terrain vehicle and $4,800 to the Wildlife Commission to support research and management of wild turkeys. From left to right are Bill Luckey of the Charlotte chapter, John Karriker, president of the Federation, Eddie Adkins of the Charlotte chapter, David Cobb of N.C. State University (sitting on the vehicle; he will use it in his research along the Roanoke River), Robert Sinyard of the Gastonia Chapter, Ed Norris of the Charlotte chapter, and Brian Hyder, leader of the Wildlife Commission's wild turkey project.*

*Check-In For Wildlife*

## Nongame Program Supports Environmental Education



Rick Estes

***Keep 'em Learning:*** *Environmental education is just one of the activities supported by the North Carolina Nongame and Endangered Wildlife Fund. You can continue this work by contributing to the fund through a checkoff on the 1985 state income tax return.*

Would it make you feel good to know that you've helped restore an endangered species to North Carolina, or helped youngsters learn more about conservation and our natural world?

If the answer is yes, then all you need to do is contribute to the North Carolina Nongame and Endangered Wildlife Fund through a checkoff on your 1985 state income tax form. Instructions on how to contribute are found on page 3 of the instructions accompanying form D-400, and contributions are made on line 23. You may contribute a portion or all of your refund, (but not less than $1), and deduct this contribution from your income the following year.

Last year, over 32,000 North Carolinians contributed approximately $300,000 to nongame projects through this checkoff. These contributions supported continued restoration projects for endangered bald eagles and peregrine falcons, protection of threatened loggerhead sea turtles, management of colonial waterbirds, introduction of Project WILD and CLASS Project into the schools, helped purchase unique bottomland hardwood forests along the Roanoke River, and supported many other activities.

"We're proud of the accomplishments of the Nongame and Endangered Wildlife program, and grateful for the support we've received from the citizens of North Carolina," said Debbie Paul, supervisor of the Wildlife Commission's Youth Activities and Environmental Quality Section. "To continue this work, however, we need your help. The literal bottom line for nongame and endangered wildlife projects in North Carolina depends on how citizens fill out their tax returns in the next few months."

If your tax returns are prepared professionally, tell your accountant that you wish to contribute to the Nongame and Endangered Wildlife Fund. If you aren't receiving a refund but wish to support this program, tax-deductible contributions may be sent to the Nongame and Endangered Wildlife Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.

*On 140 Radio Stations*

## Wildlife Hits The Airwaves

If you'd like to hear more news about hunting and fishing, wildlife conservation, environmental issues and other outdoor topics just tune in to your local radio station. *North Carolina Outdoors*, a weekly, three-minute radio show produced by the Wildlife Commission's Division of Conservation Education, is aired on over 140 stations across the state. Sixty-two stations use the 3-minute program, and in addition the North Carolina News Network syndicates a 2-minute version of the program which is aired on an additional 80 stations.

For information on when the program is aired, call your local station.

Interested radio stations that would like to be added to the mailing list for the program should write to the Division of Conservation Education, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.

*Supported By Nonresident License*

## DU Donation Protects Habitat

Deborah Conger

***Dollars For Ducks:*** *The Wildlife Commission recently presented Ducks Unlimited with a check for $7,944 to help protect and manage waterfowl breeding areas in Canada. By law, $1 is designated for this purpose from the sale of each nonresident hunting license sold in North Carolina. From left to right are Don Manley, South Atlantic field operations supervisor of Ducks Unlimited, Glenn Harrelson, state chairman of Ducks Unlimited, and Jerry Wright, chairman of the N.C. Wildlife Resources Commission.*

*Fish Barrier Built*

## New Day For Schuler Creek

Jay Davies

**An Honest Day's Work:** *Members of the Hiwassee Chapter of Trout Unlimited recently pitched in to build this rough-fish barrier on Schuler Creek near Murphy on the Nantahala National Forest. The work was a cooperative project with the Wildlife Commission and U.S. Forest Service.*

*Rough fish, which compete with trout, were removed from the portion of the stream above the fish barrier. Later, the water was stocked with several thousand brook and brown trout.*

*Biggest Haul Since 1953*

## Shrimpers Have Great Year

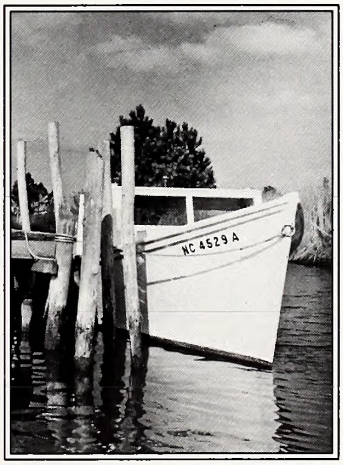
North Carolina shrimp fishermen had a banner year in 1985. The total shrimp catch was 10.8 million pounds with a "dockside" value of $19.1 million, the second-best catch on record. This catch was surpassed only in 1953 when fishermen caught 14.6 million pounds of shrimp worth $3.6 million. The 1984 catch was 4.8 million pounds valued at $10.1 million.

What accounted for the record catch? Near perfect conditions in the sounds.

"Over the years, we've found that survival of shrimp in our prime nursery areas is best at high salinity levels," said Ed McCoy, assistant director of the N.C. Division of Marine Fisheries. "Post-larval shrimp migrate from the open sea to the prime nursery areas in early spring. When the shrimp arrived this spring, salinity levels were high because there had been little rainfall and freshwater runoff. Furthermore, we had a dry spring and summer which maintained these salinity levels. Consequently, the survival rate for shrimp was excellent. Also, some areas which normally aren't salty enough for shrimp served as additional nursery areas. You seldom see shrimp in Slocum or Tucker Creeks on the lower Neuse River, for example, but salinity levels were high enough for both of these to serve as nursery areas. Other species of fish and shellfish also fared well."

Will next year produce another banner catch? No one can say. "Shrimp are an annual crop, and the catch varies greatly from year to year," said McCoy. "Shrimp populations are totally dependent upon conditions over a 12-month period, and salinity levels in the early spring are especially critical. In general, a dry spring going into a drier summer is best for shrimp."

Shrimp are North Carolina's most valuable commercial fishery, and approximately 8,000 vessels are licensed to fish for them in our waters.




Joel Arrington

**Good Times:** *North Carolina fishermen landed 10.8 million pounds of shrimp in 1985, the best season in over 30 years.*

## The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

**Status on October 31, 1985**

| | Numbers Sold | Revenue Received |
|---|---|---|
| Lifetime Sportsman's License | 16,011 | $4,470,240.02 |
| Lifetime Hunting License | 123 | 23,806.21 |
| Lifetime Fishing License | 904 | 158,461.51 |
| Lifetime Subscriptions to Wildlife in N.C. | 611 | 72,324.37 |
| Contributions | — | 64,494.67 |
| Fund Total: | | $4,789,326.78 |

*Deadline For Orders June 30*

## Sportsman's Stamp Prints On Sale

***Fish Of Your Dreams:*** *Wildlife artist Duane Raver of Cary captured the excitement of a largemouth bass hitting a topwater plug in the 1986 North Carolina sportsman's stamp.*

*Orders for limited-edition, art prints of this stamp will be taken through June 30, 1986. Several types of prints are available. For more information, write N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.*

## The 1986 North Carolina Wildlife Calendars Are Here!

Along with twelve wildlife art selections, the 1986 North Carolina Wildlife Calendar features a complete almanac section including hunting seasons, wildlife facts, boating access areas, and ferry schedules.

For the perfect gift for your outdoor enthusiast, order a calendar today!

Please send me ..... N.C. Wildlife Calendars at $6.00 each $_____

Wake County residents add $.27 sales tax per calendar _____

Other N.C. residents add $.18 sales tax per calendar _____

Enclosed is my check for ..... Total $_____

SOLD OUT

Name _____

Address _____

City/State/Zip _____

Phone (_____) _____

Send order to: CALENDAR; N.C. Wildlife Resources Commission; 512 N. Salisbury Street; Raleigh, N.C. 27611

All orders must be prepaid. We do not bill. A $10.00 charge will be made on returned checks. (N.C. G.S. 25-3-512).

For fund raising and bulk rate information (10 calendars or more), call 919-733-7123 for additional information.

**ORDER TODAY!**

## Calendar Of Events

**February 1-2**
Carolina Fossil Fair at the Schiele Museum of Natural History in Gastonia.

**February 5-7**
Southern Farm Show at the North Carolina State Fairgrounds in Raleigh.

**February 5-9**
Mid-Atlantic Boat Show at the Convention Center in Charlotte.

**February 14-16**
Fourth Annual Southeastern Wildlife Exposition in Charleston, South Carolina. Features wildlife art, carving, memorabilia and other crafts. For more information contact the Southeastern Wildlife Exposition, 606 Trolley Road, Summerville, SC 29483.

**February 14-16**
Bass Anglers Expo at the Coliseum in Greensboro.

**February 15**
North Carolina Bowhunters Association annual convention at the East Iredell Elementary School in Statesville. Features seminars on bowhunting, displays of equipment, and other events. For more information contact the N.C. Bowhunters Association, Rt. 4, Box 91, Morganton, NC 28655.

**February 15-22**
North Carolina Nature Artists Association will have its first show at the Home and Garden Show at the Raleigh Civic Center.

**February 19-23**
Carolina Power and Sail Boat Show at the North Carolina State Fairgrounds in Raleigh.

**February 26**
Second Annual National Wild Turkey Banquet at 6 p.m. at the Radisson Plaza Hotel in Charlotte. Sponsored by the Charlotte Chapter of the National Wild Turkey Federation. Features dinner and auction with proceeds to be used for management and restoration of wild turkeys. Open to everyone. Dinner includes membership in the National Wild Turkey Federation.

For more information contact Glen Harrelson, Banquet Chairman, P.O. Box 26804, Charlotte, NC 28213.

**February 28-March 2**
First Meeting of the North Carolina Wildlife Rehabilitators Association. Features an organizational meeting and workshops on various aspects of wildlife rehabilitation. For more information contact Dorothy Foy, P.O. Box 457, Oriental, NC 28571.

## Wood Duck Boxes Work

Dear Sirs:

Do you have any plans available for wood duck boxes? I'd like three sets—one for myself, and two to pass on to my friends.

I recently looked through dozens of old copies of *Wildlife In North Carolina* without finding a reference to this subject. Seems like it might be a worthwhile item to feature occasionally.

*—E. E. Brown*
*Davidson, N.C.*

*We agree. Free plans for wood duck boxes are available from the Division of Conservation Education, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.*

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**Deer Mouse**

Because it is nocturnal and found only in the western counties, the deer mouse is not encountered as frequently as some other mammals.

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# WILDLIFE IN NORTH CAROLINA

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# Fly Fishing For Grouse

*by Jim Dean*

I quote herewith this report by Charlie Carson which appeared in the fall 1985 issue of *The Flyline*, a newsletter published by the North Carolina Council of Trout Unlimited.

"Bud Hunter from Hendersonville and a member of the Land O' Sky Chapter were fly fishing on the Tuckaseigee River in Jackson County recently and Bud brought his old bird dog, Pal. As Bud was fishing, Pal was in the laurel thickets in search of grouse. One flushed out and flew directly over Bud as he was making a backcast. The bird became tangled in the leader and took 10 yards of line; however, the 6X tippet broke and the grouse took his favorite fly and continued flying downstream. Although I was on the trip fishing elsewhere, Alex Bernhardt from Lenoir was with Bud and swears that this tale is true."

This report has the ring of truth, and moreover has the potential for revolutionizing the sport of grouse hunting. It has long been recognized that one of the disadvantages to hunting is the inability to come up with any sort of catch-and-release mechanism that could prove workable. Discounting those sportsmen who have solved this problem by simply missing all their shots, there has heretofore been no way to collect a bag limit and also release it no worse for wear. Or to put it in the jargon of professional wildlife enforcement officers, once a critter has been "reduced to possession," there is no way to "enlarge it to freedom."

But suppose you could combine the best elements of fishing with those of hunting and come up with a workable combination? That's what it appears that Bud and Pal have done. There remain, however, some unanswered questions. If it is apparent that a 6X leader is too light, then what test leader would hold an adult grouse? Obviously, 1X would be unsporting, but what about 4X or 5X? Would bamboo flyrods be suitable, or should the grouse angler choose a graphite or boron rod? It would seem that a glass rod might be a violation of propriety, and certainly no sporting grouse angler would stoop to a casting or spinning rod.

Furthermore, our reporter is typically obscure in naming the fly pattern that proved successful in this instance, saying only that the grouse took Bud's "favorite fly." 'Fess up fellows, was it a grouse and teal pattern, a soft-hackled partridge, or something else? I'm only guessing, but I'll bet it was a terrestrial since it is a fact that grouse like beetles, ants and other insects as well as fruit and berries.

This brings up another point. Would grouse anglers be restricted to the use of artificial imitations, or might there be certain covers set aside where it was permissible to use natural bait? If so, I foresee a controversy since it is all too clear that mortality will be higher for grouse that gulp a succulent natural fox grape threaded on a Mustad as opposed to being lightly hooked in the beak by a carefully wrought imitation grape made of hair from a purple deer. Would grouse anglers claim that a bird on a hand-tied fly is worth two on a bush bait? Would it be considered unsporting to hook a grouse on the ground, or must one cast only to rising birds? Would there be a great hue and cry to stock fingerling grouse in areas where populations ebbed? These are not mere questions of proper regulation and management, but seek the higher ground of acceptable, even ethical, behavior.

I can't settle these matters here, but this whole business reminds me of an incident I witnessed some years ago when I dropped in to visit a friend one afternoon. He was out in the woodlot behind the house stalking those little striped lizards which biologists persist in calling skinks. He wanted to photograph them, but they were not in the mood. They were also a good bit quicker than he was, but alas, not quite as clever. Using a 10-foot surf rod, he had run monofilament through the guides so that a small loop protruded from the tip. Although the skinks would not let him approach any closer than about 8-feet, they were not alarmed by the rod and he was able to creep within reaching distance and slip the almost invisible loop over their heads. Then by pulling on the monofilament, he could close the loop around their necks and "reduce them to possession."

He was so fascinated by this advance in technology and the sporting qualities of the capture, he had totally forgotten why he had ever wanted to catch them in the first place. When I arrived, he had already captured half a dozen, gently releasing them, and was concentrating on only the most wary skinks.

"I think I'm on to something here," he whispered excitedly so as not to alarm his prey. "With the proper exposure, this could become a national sport. Chapters of Skinks Unlimited would be formed, and members would hold annual fund-raising banquets and auction paintings of skinks. I've already determined that a proper skink rod would be about 12-feet long and have a very delicate tip action. Graphite, because of its light weight, would be ideal. Skillful skinkers could play them on cobwebby 8X leaders."

I must have looked a bit dubious because he paused a moment, apparently lost in thought. "Of course, they don't jump much," he added as he unjointed his surf rod and leaned it against the wood shed.

We walked back to the house and sat on the porch. "You don't think the world is ready for this, do you?" he asked. "Well," I answered, choosing my words carefully, "most of mankind's great thinkers have been ahead of their time."

P.S. to Bud and Pal. If grouse angling doesn't catch on, you might keep that in mind.

March, 1986
Volume 50, Number 3

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# WILDLIFE IN NORTH CAROLINA

*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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**Cover** *A robin feeds its young in this annual rite of spring captured here by Dr. Richard Bird's 35 mm camera. There's more to this common songbird than meets the eye, however, as Jane Rohling points out in her article in this issue.*

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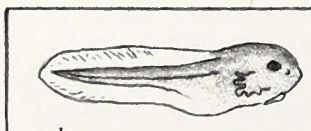
***The wood frog*** *attaches its nearly 2,000 eggs to a submergent plant just below the pond's surface (above). After the eggs hatch, the tadpoles will take 40 or 50 days to transform into an adult frog, although most will be eaten by predators. Some stages in this process are shown below along with approximate age. In the early stages, the transparent tail is visible along with the gills that will soon disappear. The rear legs appear as buds at the base of the tail, eventually breaking through the surface of the skin. The tadpole's tail gradually shortens until it is no more than a stub (upper right). Finally it disappears and transformation is complete.*



*117 hours*

*376 hours*

*830 hours*

*902 hours*

# Tadpole Watching

*written by Lawrence S. Earley / illustrated by David Williams*

The trick to watching tadpoles, as to growing up, is patience. Taking the long view is advisable. Tadpole eggs require anywhere from three to 25 days to hatch, depending on temperature and other conditions. The tadpole generally dawdles through its early development but then practically sprints to the finish. First hatched, the tadpole is fishlike in appearance, propelling itself about by means of its long, flat tail. As it develops, it grows longer and its tail becomes more transparent so that tiny blood vessels are visible. The tadpole has internal gills which it will lose. The hind legs appear as little buds at the base of the tail then the front legs break through the skin. The tadpole seems very much like an adolescent, half tadpole and half frog.

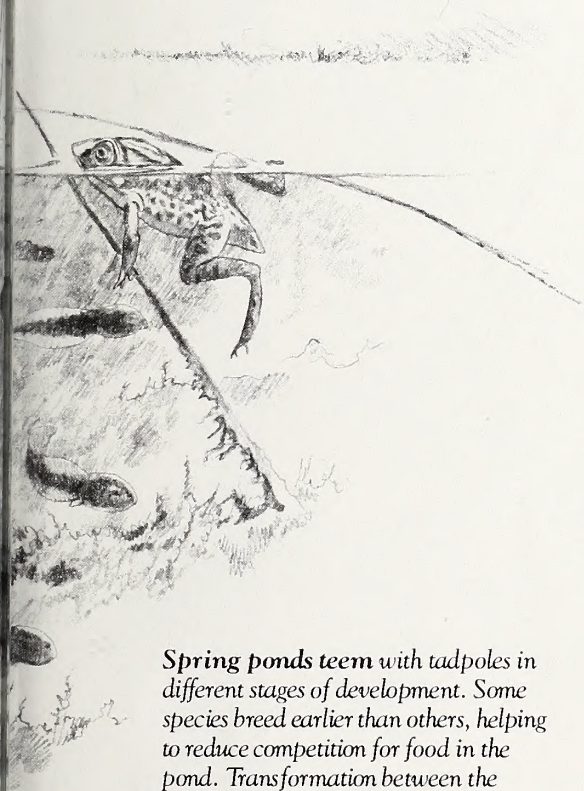
Now is the best part of watching tadpoles. Changes occur sometimes within hours. Most visible, of course, is the progressive shrinking of the tail. When the tail disappears, transformation is complete. During the last stages there are internal changes as well as external ones. The internal gills give way to lungs, the long intestines shorten to enable the herbivorous tadpole to become a carniverous frog.

Most frogs and toads take about two to three months to transform, although there are extremes of both. The spadefoot toad is ready in two to three weeks while the average bullfrog takes a year or more before transformation. The difference is a result of habitat. The spadefoot breeds in temporary pools formed after heavy rainfalls while the bullfrog haunts ponds, streams and lakes. Because temporary pools will dry up, the most important thing for the spadefoot is to get out. Since there are no predators in a tobacco field puddle, the tadpole can eat quickly and develop fast enough to transform before the puddle disappears. Bullfrogs and other species in permanent water have to cope with predators of all kinds, including fish, snakes and wading birds, and so they have developed warier, more secretive behavior. They have learned to come out of hiding when predators are gone, feeding at night and coming into the shallows only after dark.

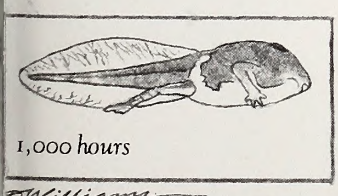
Competition also has an effect on tadpole behavior. In some ponds, says Alvin Braswell, curator of lower vertebrates at the N.C. Museum of Natural History, breeding tends to be spaced out over the year. In some of our Carolina bay ponds, for example, leopard frogs breed in November and December. In January comes the first of our spring breeders, the ornate chorus frog, followed by the spring peeper and southern chorus frog. In March the first of the toads appear, the southern toad and Fowler's toad, and other frogs and toads follow throughout the spring. Such spacing reduces competition for food.

Competition is further reduced, says Braswell, when different frog species partition the pond among them. Some tadpoles work the weed stems up and down, a few filter their food from the water, while others are bottom feeders. Toad tadpoles eat along the pond edges where fish predators cannot get them so easily. More alert and secretive spring peeper tads are found in deeper areas of the pond and in still deeper waters are leopard frogs, bullfrogs and pickerel frogs, all of them fast swimmers and very alert.

In nature's vast theater, the tadpole is a lowly actor. And yet watching its progress and learning something about its ways can acquaint us with some of nature's highest mysteries. ⊠



***Spring ponds teem** with tadpoles in different stages of development. Some species breed earlier than others, helping to reduce competition for food in the pond. Transformation between the tadpole stage and the adult stage may take anywhere from a few weeks to a year or more. But even when the tadpole has transformed into an adult, it is not immediately sexually mature. The little grass frog is perhaps our fastest maturer, transforming in June and ready to mate in August. The spadefoot toad, on the other hand, hops out of the water in record time but takes up to three years to mature.*



1,000 hours

D. Williams

# The EARLY BIRD

**...Catches the worm, right? And each spring, the robin is one of our earliest arrivals. In fact, some never leave, and that's only one thing you might not know about everyone's favorite yard bird.**

**by Jane Rohling**

Memory No. 1: It's 1958 and Mrs. King, my kindergarten teacher, has just passed out a mimeographed sheet of paper, smelling of ink, on which there is a simple picture of a bird for us to color. Red for the breast, brown for the back, she has instructed us. After about an hour or so of painstakingly trying to keep five-year-old hands and jumbo crayons within the confines of the purple lines, she writes the name of the bird on the board for us to copy: R-O-B-I-N.

Memory No. 2: It's summer, 1959. I have survived kindergarten and am about to participate in a nightly summer ritual with a bunch of neighborhood kids. We can hear a loud buzzing sound—something like the noise made by Flash Gordon's spaceships—approaching from down the block. On bicycles, tricycles and bare feet, we get ready to charge out into the street behind the city truck that spews out a dense white fog in its wake. For some reason we thought this was great fun. Our parents always scolded us for it. They were afraid we'd get run over by oncoming cars whose visibility was impaired by the pesticide. They probably should have been more worried about what breathing that miraculous mosquito-killing cloud of DDT was doing to us—or what it was doing to the robins. But Rachel Carson had not yet issued her warning in *Silent Spring*.

I don't know how many people share that second memory with me, but if you ask anyone to name the first bird they can remember, I'll bet you five dollars they'll all come up with the same answer: the robin.

Just what makes this red-breasted songbird so popular? Have we become especially fond of it because it seems to be so fond of us, choosing to build its nests in our shrubbery and scurrying across our lawns in search of worms? Or is it the robin's cheerful song, described by poets as the harbinger of spring, that makes this bird so popular? It certainly brightens our days after a long cold winter. Maybe it's not that the robin is so popular as that it's found just about everywhere. The range of the robin encompasses virtually the entire North American continent. No matter where you go, the robin is there to greet you like a long-lost friend. How could you help but recognize it?

Whatever the reason for its widespread popularity, and in spite of the fact that every child over the age of five knows it by name, most of us know very little about the robin. Too common to even arouse our curiosity, the robin is simply taken for granted.

The first thing you should know about the robin is that everyone's favorite bird is an imposter. The true "robin redbreast" that appears so often in European literature and folklore is a native of the Old World (*Erithacus rubecula*). Not even in the same genus as our robin, the European robin is a small bird that looks a lot like our bluebird. What the European robin has in common with our robin is its red breast and its popularity. It seems that our forefathers were so homesick for their beloved redbreast that they named our American robin after it, and despite the protests of naturalists, the name has stuck.

The American robin is actually a thrush—in fact it's the largest member of the thrush family in North America. Its scientific name, *Turdus migratorious*, means "the thrush that migrates," another source of confusion that we'll get back to later. Now, if you're thinking that a robin doesn't look at all like a thrush, look again. While the adult robin's breast is the familiar solid red, the young birds display a spotted breast-plumage that is more suitable for a proper thrush. I've always thought that the spots, like the spots on a fawn, were for camouflage, but there may be more to it than that.

The robin, it seems, is a classic example of the theory that "ontogeny recapitulates phylogeny." Sounds pretty technical for such a run-of-the-mill songbird, doesn't it? What it means is that developing organisms go through stages or conditions during which they resemble the ancestors of the species. They reenact a bit of evolutionary history

***Bright-eyed symbol** of spring, the robin actually may have spent the winter in your neighborhood.*

Leonard Lee Rue, III

within a single lifespan. While most young birds resemble the female of their own species in juvenile plumage, the immature robin doesn't favor either of its parents. However, the spotted breasts of young robins — and bluebirds — are believed to indicate that their ancestors had speckled breasts. In fact, most thrushes still retain their spots into adulthood.

Equally curious is the matter of migrating. If the robin is supposed to arrive with the first breath of spring, then why was there one "bob, bob, bobbin' along" in my front yard in the middle of January? Good question, and one with several answers.

First of all, here in the South, robins are common all year round. But, the robin you saw in your yard during the dead of winter is not necessarily the same bird that is joyfully announcing the coming of spring from your rooftop today. Although practically all robins migrate to warmer latitudes for the winter, their places are taken by hardy birds who have bred farther north. Thus, your winter robin may be vacationing from Canada, while your "harbinger of spring" has just returned from a few months in sunny Florida. So few people are aware of this fact that nearly every year someone predicts an early spring because the robins are back — when in fact, what has been misidentified as the first robin of spring has been around all winter.

Most robins do go south for the winter, but occasionally fairly large flocks remain in the Northern states and eastern Canada where they are able to withstand some pretty low temperatures. A gradual warming trend in our climate over the past century or so, may have had some influence on robins. Those that do migrate don't seem to have a particular destination in mind when they begin their southward journey. They simply wander about, stopping where food is plentiful, and sometimes roosting in huge flocks in favorite places.

The late Blanton Saunders, of Poplar Branch, North Carolina, remembered seeing flocks of robins while hunting waterfowl on the coast years ago. "I've seen them in the snow, in these holly trees, just lighting, picking holly berries, feeding — it looked like a solid bed of robins in those trees," Saunders recalled. "You don't see it no more. I've seen them migrating in the fall of the year before a cold snap, when it looked like every square yard in the sky had a bird, thousands and thousands of them."

In *Winter Birds of the Carolinas and Nearby States*, Michael Godfrey notes that "large gatherings are more difficult to find now than they were a few decades ago, though the robin population shows no evidence of decline. In 1935, a newspaper account told of hundreds of thousands of robins roosting near Chapel Hill... in a swamp, breaking down trees with the weight of their bodies, and raising a tumultuous din."

Donald Harke, supervisor of the U.S. Fish and Wildlife Service's Wildlife Assistance Office in Raleigh, told me that robins often act as decoys to bring in large numbers of "blackbirds" to roosts. Birds in some roosts number in the millions causing considerable damage to vegetation, not to mention noise and mess.

When it finally comes time for these early birds to return to their breeding ranges, they let temperature be their guide, closely following the advance of the average daily temperature of 37°F. As with most early migrants, robins travel by day, and ornithologists refer to them as "weather migrants." Since the weather varies from one year to the next, so does the time you can expect to see the first robins. To predict their arrival, watch the thermometer, not the calendar.

In case you've wondered if the robins that have nested under your picture window for the last four years are the same ones, the answer is quite possibly, yes. Information obtained by placing identification bands on robins' legs has indicated that, while young birds do not show a tendency to return to the exact area where they were hatched, once they have nested, adult robins tend to return to the same nesting territories year after year. The males arrive first, staking their claims and defending them bravely, even attacking their own image in a window reflection.

When it comes to nest-building, robins seem to concentrate their efforts more on durability than appearance. The nest is a thick bowl of mud, reinforced with leaves, twigs and coarse grasses. They may incorporate man-made materials like rags, twine, paper or plastic along with natural construction materials. And though the male may help gather supplies, the task of building the nest falls to the female.

Probably the most challenging aspect of this endeavor is obtaining the mud. In a dry year, man-made mud puddles can be a big help. During one dry spring, a robin was observed gathering mud by wading in a dish of water to wet her legs, then hopping into the dust. She then scraped her legs with her bill to get the mud off. She repeated this procedure, carrying each bit of mud to the nest in her bill, until she had enough mud for her nest. When mud is more plentiful, some robins become more selective about the mud they gather, rejecting ordinary mud in favor of worm castings!

I learned the secret of customizing a nest by watching a robin turning round and round inside the cup each time she added new material. She was using her breast and half-extended wings to mold the mud cup to the proper size. Then, using her feet and bill, she worked in a lining of soft grasses.

This whole procedure may take anywhere from five days to 20, depending on the weather. If it's too dry, finding mud may delay construction. If it's too wet, the robin has to wait several days for the mud cup to dry before laying her eggs. Heavy rains may even wash away some of the mud so that she is forced to rebuild the nest.

A robin's nest is generally found straddling a limb or braced in the fork of a tree, but robins have found that buildings and other man-made structures often provide ideal nesting sites. And, once a robin has found such a site, she may return to the same spot for several years, even building her new nest on top

## Wintry tree holds spring promises

*Flocks of migrating robins were not uncommon at one time, but are less so now. Old-timers remember when migrating robins filled neighborhood trees much like blackbirds. Many robins migrate, especially northern robins that may winter in North Carolina or farther south. Tar Heel robins may go south also, although many can endure the state's relatively mild winters. Climatic warming trends may be influencing robins' indifferent migration habits.*

**Building for the future**

*Robins build their nests of mud reinforced with grass, sticks, and bits of twine.*

Steve Maslowski

of the remains of the old one. However, robins have relatively low intelligence and highly developed nest-building instincts, and this sometimes results in a bit of confusion.

With the number of wonderful nest sites we have created for them, sometimes robins have a hard time choosing just one. One robin started five nests on different fire escape steps and another began 26 separate nests on a wooden girder in the spaces between the roof rafters it supported. Construction workers supplied the bird with pans of wet clay to line its nests, and placed bets on the location of the final, functional nest. After a week of indecision, she finally settled on one and successfully reared her brood. Yet another robin built two nests on opposite ends of a railroad turntable, alternately sitting on whichever one happened to be facing south at the time.

Robins have even been known to share a nest with birds of other species. In their film, "Birds of Our Lives," Karl and Steve Maslowski show a pair of robins cohabiting with a pair of cardinals. They shared the duties of incubation, and when the young were hatched, each pair fed only its own young.

Once nest construction is completed, robins go through a pretty routine period of egg-laying, incubation and rearing their young. The three to six eggs are, of course, "robin's egg blue," and they hatch in 11 to 14 days. For the next two weeks both parents are occupied from dawn to dusk with satisfying the voracious appetites of their demanding brood. One young robin can consume as many as 165 cutworms or 68 earthworms (14 feet of them strung end to end) in a single day.

Once the young birds leave the nest, the male takes over the task of feeding them, enabling the female to prepare for the next brood. You've probably seen him patrolling your lawn in search of worms, followed by his troop of screaming fledglings. He stops, cocking his head to one side, focusing one eye on the ground and possibly listening for worms in the earth. In less than two weeks, the young are able—though not always willing—to find food on their own.

It's during this period that the fledglings are most vulnerable to a host of hungry jaws—cats, dogs, hawks, snakes, and other predators—just waiting to snap them up. Where nests are built on limbs overhanging river banks, the fledglings' first plunge into the outside world may be their last. They jump out of the nest and into the water where they are gulped down by large fish, turtles or frogs. The house cat is probably their most dangerous enemy, though. It has been estimated that a cat will capture, on an average, 50 birds in a season, and robins make up a large part of the kill.

In spite of all the hazards fledging robins have to face, plenty of them manage to survive to reproduce. In fact, it's a good thing some of them don't make it. One biologist estimated that a single pair of robins, which commonly produce eight young per year, would leave 19,500,000 descendants in 10 years—if all the young survived and reproduced! Obviously a number of factors keep this from happening, and most of the offspring are killed off before they reach breeding age. Although one robin lived in captivity to the ripe old age of 17 years before it was finally eaten by a cat, the average lifespan is more like 17 months.

The great flocks of robins, like those of the passenger pigeon, were at one time threatened by man. Until the passage of the Migratory Bird Act in 1913, the robin was listed as a game bird in several southern states, and was killed by the thousands for sport or food. The 19th-century painter John James Audubon observed, "In all the Southern States... their presence is productive of a sort of jubilee among gunners.... Every gunner brings them home by the bagsful, and the markets are supplied with them at a very cheap rate. Several persons may at this season stand round the foot of a tree loaded with berries, and shoot the greater part of the day, so fast do the flocks of robins succeed each other. They are then fat and juicy, and afford excellent eating."

The robin, unlike the passenger pigeon, managed to survive the ravages of market hunters who sold them for as little as 60 cents a dozen, and today is protected by both state and federal laws. But in more recent years, they have faced an even greater threat. Rains washed DDT and other harmful pesticides into the soil, impregnating worms and other invertebrates with poisons. According to Godfrey, "The street which passes my home in Carrboro is frequently smudged with the flattened remains of robins that had been too sluggish from ingested poisons to get out of the path of an automobile." Robins have become casualties in the urban war to save shade trees from Dutch elm disease, our crops from hungry hordes of insects, and our hides from mosquitoes (enter Memory No. 2). "The robins, of course, are a vastly more effective and economical means of insect control," observed Godfrey, "But they can't afford quite as many prime-time TV commercials to promote themselves as can chemical conglomerates."

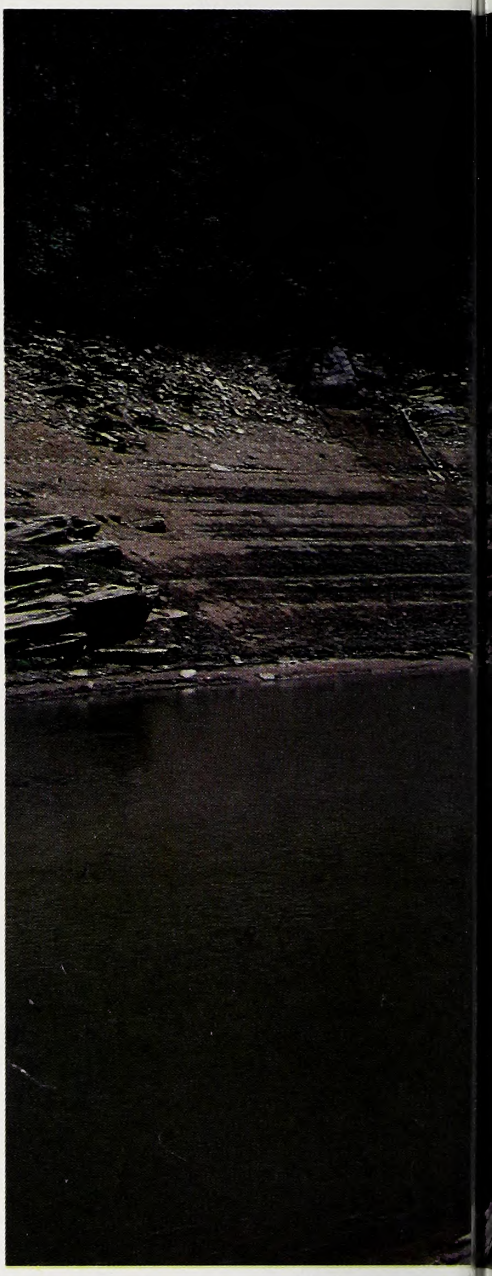
Still, the economic status of robins has received considerable attention over the years. An examination of their stomach contents has revealed that over 42 percent of their diet consists of animal matter, including large numbers of noxious insects. And, while the remaining 58 percent is made up of small fruits and berries, over 42 percent of this portion is made up of wild fruits. It cannot be denied that robins eat large amounts of cultivated fruits at times—especially cherries and berries—but it must also be noted that their raids on our crops are due largely to the destruction by man of the wild fruits they prefer. The use of a good old-fashioned scarecrow and planting a few fruit-bearing trees, shrubs, and vines for the birds will help protect most fruit crops.

A little cooperation with nature is all it takes to keep our robin around. In exchange, America's favorite bird will continue to grace our days with its colorful dress, its beautiful song, and the early promise of spring. And future generations of school children will be able to share the memories of coloring the bird that everyone seems to know. ⊠

# Little Tennessee WALLEYES

## When the walleyes leave Fontana Lake to spawn in the Little Tennessee River each spring, the fishing can be great.

written and photographed by Jay Davies



It's a magic time." That's how Bob Ray of Cullowhee describes the spring walleye fishing on the Little Tennessee River. Beginning early each spring, the walleyes run up into the lower end of the river out of Fontana Lake in Swain County to spawn. At times, the fishing is excellent. Dr. Ray, who is chairman of the Department of Health, Physical Education and Recreation at Western Carolina University, recalls that he and a friend once caught their limits of eight fish each in about 15 minutes, and they were fishing in a spot that measured only about 30 feet across. No wonder he thinks the walleye spawning run is a magic time.

But you say you've never heard about it. Well, I'm not surprised. These old mountains tend to protect their treasures, and permit only a few close friends to cherish them. Even so, since the fishing is good and the harvest doesn't hurt populations, maybe it's time to share the good news about the walleyes and the river most anglers affectionately call the Little T. The best way to do that is to describe my first trip last year.

The weather was balmy, and the air was full of the first sounds and smells of spring. I parked my car in the already overflowing dirt parking area next to the U.S. 19 bridge and searched among the accumulation of paper coffee cups and dust covering the back seat for my rod and tackle box. Moments later I scampered down the bank to the river. Somehow, I knew that the time was right. I passed a group of anglers, and recognized them even though I hadn't seen them for a year. They smiled and waved.

"Have they started yet?" I asked, hoping I was not late.

The nearest angler grinned and lifted a stringer of walleye from the river. Their yellow and black-speckled sides glistened in the morning sun, and I kicked myself for not getting up earlier.

Just then a small boy up the river let out a holler as his rod bent, and I began to think maybe I was not too late afterall. Fumbling in my pocket for a white doll fly, I rushed on, pausing only a moment to watch the boy land a flopping walleye. Then, it was my turn, and I was soon hooked up with my first walleye of the day.

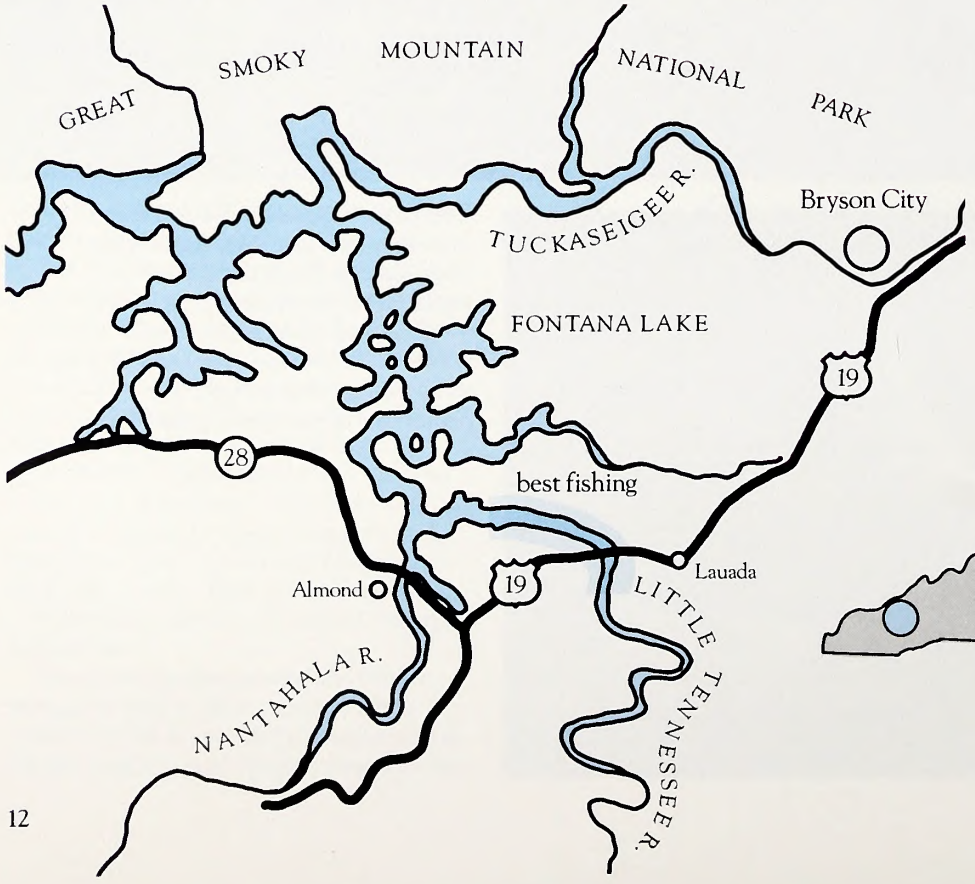
It's a special time, and even the fish know it. They have been preparing themselves during the previous 12 months for just this moment when it will be their turn to ensure the continuation of their species. The male fish are the first to enter the river, and they usually arrive sometime during the middle of February. For the next two or three weeks, they are basically just waiting for the females to arrive. The males average 14 to 19 inches (usually only the females exceed 20 inches).

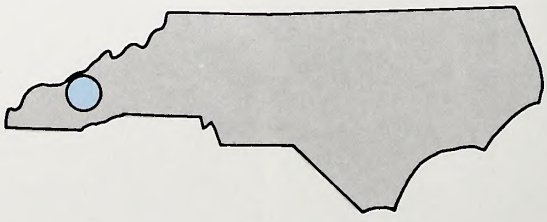
During early March when the water temperature in the river reaches 60°F, the females finally join the males and the spawning run is considered officially in progress. The action is fast and furious then and it is not unusual to hook a fish almost as soon as the lure hits the water. Unfortunately, this fast-paced fishing is unpredictable and can stop as quickly as it starts. The best times of the day, however, usually occur between sunrise and 10 a.m. and then again in the afternoon between 4 p.m. and sunset.

The anglers who gather on the banks of the Little T come from all walks of life and even though they may never see each other except for this one time during the year, the separation seems unimportant. It is not uncommon to see them greet each other like former classmates. I have walked the banks of the river, talking with some of the fishermen and eavesdropping on others, and I found their conversations almost devoid of discussions about the merits and liabilities of different kinds of fishing tackle. This stuff doesn't seem to be important to them, and most anglers opt for inexpensive closed-faced reels and solid glass rods. I point this out only to indicate what's considered adequate; there's certainly no disadvantage to using high-quality light rods and reels. Six-pound test monofilament line is a popular choice because walleyes don't have a reputation for putting up much of a fight. A few anglers use 15- to 20-pound test line, but that's probably because they like to tug a little harder when they get fouled on the bottom.

Did I suggest that walleye fishing need not be expensive? That could be misleading because river fishing takes a heavy toll on lures. Indeed, if an angler is overly concerned about losing lures he will not fish properly. For this reason, many walleye fishermen

***The Little Tennessee River*** *(above) provides a treat for anglers each spring when walleyes spawn in the lower reaches just above Fontana Lake, and you don't need a boat to get in on the action. Bank fishermen (left) who hit the spawning run at the right time frequently make outstanding catches.*



***A walleye** is the largest member of the perch family, and is not a "pike," although that is a common name for them in some areas. They may average about a pound or so, but 5 pounders are not uncommon, and the world record is a 25 pounder from Old Hickory Lake in Tennessee. Fishermen can walk along the banks of the Little T from the U.S. 19 bridge to reach the best fishing areas.*

**"The secret is to work the jig slowly and keep it close to the bottom where it may get hung, but where it's also most likely to provoke a strike."**

make their own lures.

Yellow or white doll flies and lead-head jigs painted white with red and black eyes are popular baits here. They are colorful and easily seen in the sometimes dingy water, and they also have the weight necessary to keep down near the bottom. Jigs and doll flies are easy to make, requiring only a block of scrap lead, a mold, some hooks, paint, feathers, and a stove and sturdy pot to melt the lead (beware of breathing the poisonous lead vapors, however.) By using a little initiative an angler can turn out enough jigs and doll flies to last several seasons at a cost of less than 25 cents each. The effectiveness of jigs is usually enhanced by adding soft plastic tails which may be purchased in bulk.

Because migrating walleyes tend to rest in quiet eddies and pools behind boulders and along the river's bank, these areas are among the most productive to fish. Most anglers cast their jigs toward the upstream end of the pool and then, using a pumping action with the rod, slowly bump the jig across the bottom. To be effective, the jig should be raised no more than a foot off the bottom before letting it free-fall back. The secret is to work the jig slowly and keep it close to the bottom where it may get hung, but where it's also most likely to provoke a strike.

Plugs are also popular and despite their cost will frequently work when other methods won't. Shallow-running, 3- to 4-inch long Rebels, Rapalas, and Bang-O-Lures painted to resemble threadfin shad are usually productive. The plugs should be fished across a pool in a series of short, quick jerks so they simulate the swimming movement of a shad, an important food for walleye in Fontana.

Because plugs are considerably more expensive than jigs, getting them stuck under a rock ledge can be very costly. The plugs float however and the angler can sometimes get them loose if he can pull on the line from an upstream direction. In instances where the plug refuses to float free, a device called a "plug knocker" is a handy item to have stuffed somewhere in a tackle box. Plug knockers may be purchased at a cost of several dollars, but they are so simple to make it almost seems a waste of money not to do so. A knocker consists of a half-pound chunk of lead which has been molded into the rough shape of a bullet. Several 3-inch long sections of chain are embedded into the flat bottom part of the lead and a small eye-bolt is molded into the pointed tip. A stout line is attached to the eye-bolt along with a large snap swivel.

To use the knocker, take up the slack in the fishing line and lift it above the water surface to provide an incline. Attach the knocker to the fishing line with the snap swivel and, holding the fishing line and the heavy line attached to the knocker, let the knocker slide down the fishing line. If all works well, the knocker will bump into the plug and either knock it loose or entangle its chains with the plug's hooks. If the latter happens, the angler may, by pulling on the knocker line, succeed in dislodging the plug. Don't become discouraged if it takes several tries to free the plug. In fact about the only thing that can go wrong is when both the lure and the knocker become hopelessly entangled on the obstruction. If that occurs, all you can do is cut your losses and tie on another plug.

Live bait is, of course, an old stand-by, and it works for walleyes, too. Minnows, crayfish, and salamanders are great, but unfortunately they either cost too much or can only be kept alive for a short time. If the fish aren't biting, the cost of these baits translates into a lost investment. Nightcrawlers on the other hand are every bit as effective as other types of live bait and not only are they easy to keep in the refrigerator, they are also inexpensive or can be gathered free the night before. In fact nightcrawlers have such a proven reputation that many anglers use them to locate walleyes, then fish for them with lures.

A proven "fish-finder" rig commonly seen on the Little T consists of 10-pound test monofilament run through a slip sinker and attached to a double swivel. A 12-inch length of 6-pound test monofilament with a No. 6 hook attached is tied to the other end of the swivel. The angler fishes the rig by bumping the sinker along the bottom allowing the nightcrawler to trail behind just off the bottom. The beauty of this rig is not only that it catches fish, but that it is usually the sinker which gets hung up and it can often be dislodged more easily. In the rare event the hook becomes hung, the lighter 6-pound test line will break first and all the angler loses is his hook and a bit of line. The sinker and swivel are retrieved and can be quickly re-rigged.

Boats are definitely not needed when the fish are running, but because spawning fish are continually migrating into the river, good fishing can often be found in the lake within a mile or two of the river's mouth. Also, when a sudden cold snap temporarily drives the fish out of the river and back into the lake, a boat can be a handy item.

Walleyes waiting to enter the river or driven back by a sudden change in the weather seem to congregate off rocky points that drop rapidly into adjacent deeper water. Locating these congregations is relatively easy with the use of a depth finder, but anglers were finding fish long before the use of electronics.

One of the best methods to fish the lake is to tie on a nightcrawler "fish finder" and work the banks, while your boat drifts with the current down the lake. Often, the fish will be found in 10- to 15-feet of water. If a walleye is hooked, throw out a marker or anchor because where there is one, there are often more.

Whether fishing from a boat or from the bank, anglers should practice good safety procedures. Life jackets should be worn by everyone in a boat, and also by any bank fishermen who are non-swimmers. Children should, of course, always wear a life jacket when near water. Hypothermia, or exposure, is another threat this time of year, and anglers should familiarize themselves with its warning signs and the proper treatment.

Appropriate clothing is a must during these early spring days. The weather is unpredictable and even on sunny days temperatures can plummet suddenly when the late afternoon sun dips behind a mountain ridge. "Layering" light clothes is the best strategy and anglers should dress for cold temperatures and shed layers as the air warms. Don't forget to pack a poncho and some spare clothes too just in case an April shower catches you unexpectedly. Lightweight boots are recommended for walking the steep banks, although many anglers choose to wear sneakers or work shoes. A portable chair is an added comfort; however, its additional weight may become burdensome if it has to be carried very far. There are usually plenty of boulders to sit on and even when there are not, the bank of the river always provides a comfortable seat.

During most years, the mouth of the Little T is somewhere within walking distance of the U.S. 19 bridge, approximately six miles west of Bryson City. Parking is available at either end of the bridge and well-worn paths lead down to the river. For out-of-town visitors, lodging and food may be found in nearby Bryson City and Sylva. ⊠

# CLASSROOMS IN THE WILD

## To educate means to lead out, and the outdoors is exactly where Hollis Rogers led his students to teach them about science.

interview by Lawrence S. Earley

*When Dr. Hollis Rogers retired in 1978, the state lost the services of one of its ablest outdoor educators. In a teaching career that spanned 31 years, this emeritus professor from the University of North Carolina at Greensboro estimates that he reached 18,000 students.*

*Many of these thousands were taught in the elementary and high school science courses he gave at UNC-G. But he also took his act on the road, teaching two-week courses in other North Carolina cities and towns over the years. Many of his students know him through the Greensboro school camping program — later known as the School in the Woods — that he was instrumental in founding in the 1950s. Still others know him through the science course that he gave on University of North Carolina television also in the '50s.*

*He has preferred to use the state as his classroom, encouraging teachers to take their classes outside where ecological concepts can be most dramatically demonstrated. He has brought his classes to some of the most beautiful of the state's natural gardens, but he has stood outside inner city schools and shown teachers how a lone tree can also unlock the secrets of nature.*

*At his home in Greensboro, Dr. Rogers is genial and energetic, introducing you to his German shepherd Brandy and a visiting cat. His white hair bunches out from his head like snow drifts. Though ready with a laugh, Dr. Rogers bristles when he hears people say that God created the world for man to use as he sees fit. "I believe that man is a part of the world and that he better be careful of how he uses it," he says.*

Wildlife In North Carolina *talked to Dr. Rogers to find out about his approach to outdoor education. We began by asking him, "What did you teach?"*

I've been asked that many times, and I've always said "people." What that means is that I used the fields of biology, natural history, nature study and so forth to teach that person — and I've taught 18,000 people in my career. That's a little foreign to most college professors' idea because they have a course to teach. I never had a course to teach until I had my students and found out what it was.

I taught at the University of North Carolina at Greensboro from 1947 until December 31, 1978. In 1947 every North Carolina elementary teacher had to have a course in nature studies, natural history. That was required for teacher certification. To me that course of study meant orienting the individual to the environment they were going to live in. In other words my objective was to take a nice person and give him a little education which would make him a happier or more effective person in his environment. And I insist that if you don't know the world you live in you don't know how to live in it.

I was born on a farm in western Kentucky. It was a very poor situation, a general purpose farm with tobacco and all the grains and livestock and so forth. I suppose growing up there influenced me as much as anything. I was the first one in my family to go to high school. And I got in 4-H club work and was selected as the Kentucky 4-H club dairy champion back in 1930 which influenced me to want to go to college and get an Ag degree. And my first semester in college I took freshman biology and had a super teacher, Alfred M. Wolfson.

I decided I wanted to be a bacteriologist. And Dr. Wolfson loaded me up one day and took me over to a Veterans Administration hospital and let me spend four hours in the laboratory with their bacteriologist. It was a 50-mile trip. And on the way home I said, "That's not what I want to do." And he said, "That's the reason I brought you over here." See, he taught people.

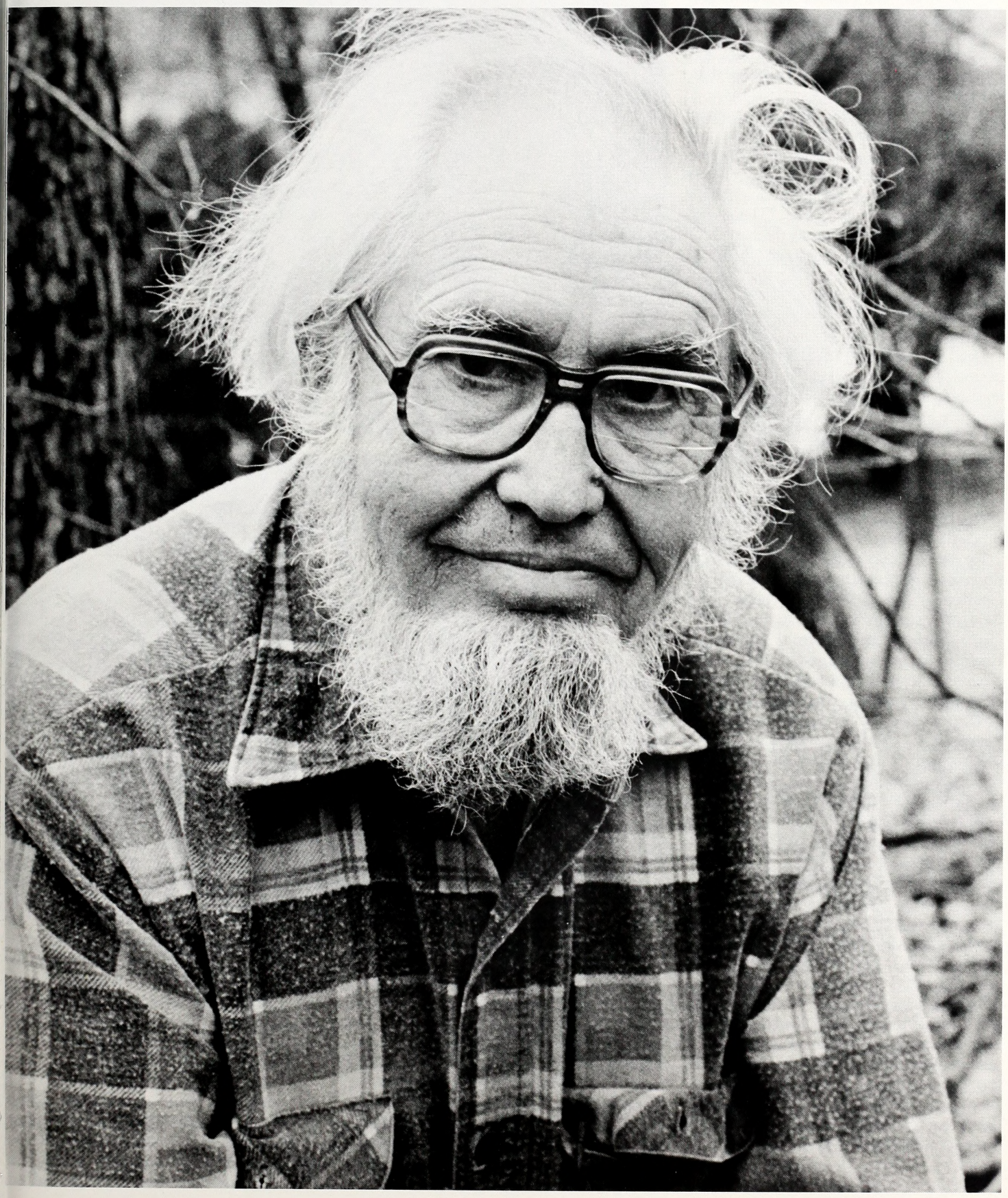
The first college teaching I did was in 1940. I was finishing my masters in botany at the University of Kentucky and I had done all my course work. And one day the head of the biology department and the chancellor at Morehead State University — it was called Morehead State Teachers College then — came into my research office and offered me a job at the college for the spring semester. I was to teach their science courses for teachers. The schools got out early there and the semester started in February in those mountain schools and the teachers were back in college doing undergraduate work toward their degrees.

So I went out there and I had a group of 25 eastern Kentucky mountain teachers in a course labeled Nature Study for Teachers. And another class of a dozen in Ornithology. I met them, found out what they were doing, and decided that they needed to learn about those mountains. The college was in the mountains. So every morning in the week at sunrise, we would walk a quarter of a mile and be up a mountain stream, in the woods. And we worked until the cafeteria opened and then we'd have our breakfast. After that we'd have our day's lessons.

Now, these morning trips were voluntary, but they were so durned much fun. This was in the spring, April and May, when everything was happening in the mountains. I had them prepare notebooks which would be their textbooks when they went back in August to open their schools. In other words, I used nature as their science laboratory.

When I came to UNC-G, I came here with the understanding that I would teach nine months and then get out of Dodge because I was not spending my career at a woman's college. It was a girl's school and I

***To Hollis Rogers**, nature study means learning about your environment. "If you don't know the world you live in, you don't know how to live in it."*



had an image of a female college. But I found it the ultimate in a place to teach because the students had few distractions and they were the cream of the crop in North Carolina and everywhere else. It was a luxury school that the state provided.

When I first came the old biology teachers were complaining about the freshman students coming in so unprepared. I got into trouble a lot of times by asking them, "Who's the teacher out there," and they could tell me instantly: "One of ours." I said, "There's the problem. We're not preparing them to teach." In other words, they taught them biology from the book and then the students went out to teach their students by the book. They were teaching them biology instead of teaching people.

I had very few textbooks in my teaching career. Most of the courses didn't have a textbook. They had reference books to use. But a textbook makes a course and you teach the textbook then. The textbook can't be written for each individual. So I tried to fit it to the individual.

For example, in my early years at UNC-G, I taught a course called Nature Study for Teachers. At first it was a group of 20-some Greensboro teachers, a late afternoon class. But I also taught that course in Charlotte, Asheville, Winston-Salem, Reidsville, and Burlington in addition to Greensboro. In Greensboro, we had the first meeting on campus and I arranged that the remainder of the class meetings would be at my students' home schools. We would go there and learn what natural science laboratory they had at their schools. Now some of them were suburban schools, with a nice piece of woodland. Some of them were slum schools with a playground.

One time I went to Reidsville. The school yard was small and gullied all over. But there was one big tree right outside the high school classroom where I was teaching the course. And I took that tree on as a project. What went on in that tree and under it? Where did it get its water, its minerals? What insects went in it, what wildlife and birds, squirrels and chipmunks were around it? That's what I did with that course there. Every one of the teachers said they had a similar situation back at their school so they could go back and use what they had learned. The teachers got acquainted with the other schools, and they learned science and how to go out of doors to teach at their schools.

That's what I mean when I say I teach people.

The Dean of the Education School at UNC-G was Franklin McNutt. One Saturday he called me out of bed and says "I'm in a mess." He had attended a banquet that the governor had thrown for the state committee on Resource Use Education. He blabbed when he should have been listening and asked the governor why somebody didn't set up a demonstration of what use of natural areas should be, like an old rundown farm. He told me, "My telephone has been hot all day. I've had calls from Washington, from soil conservation people, forestry people and wildlife people saying, 'Do it!' "

***From 1947 until 1978**, Rogers taught at the University of North Carolina at Greensboro. The idea of teaching at a woman's college didn't appeal to him — "but that was before I met my students," he says.*

"I don't know what I'm talking about," he told me, "but you do so I'm going to select about 25 of the best graduate students we have — principals and teachers — and put them into a course and we're going to call it

Tom Jackson

***Rogers helped organize** the School in the Woods, a week-long school camping program at William B. Umstead Park near Raleigh. Fifth graders lived in cabins and took a full array of classes.*

Resource Use Education and my farm out here on McConnel Road is at your disposal. Take this class and come out there and do what I was talking about."

Well, we developed a nature trail out on this farm. It was a laboratory of piedmont North Carolina. It had a tobacco farm on it, it had harvestable hardwood timber on it, it had a section that had been farmed and had gone back to hardwoods in secondary succession. It had a creek that had wildlife, raccoons and possums and turtles, and wild flowers bloomed there. We set up the trail and I assigned each teacher a project on it and then all these teachers were qualified to take their kids out there.

We had to change our approach right after we started. When they set up the trail they put up beautiful colored plaques, fastened them to posts. But when the teachers got back to school and evaluated the trail they found the plaques were all that the kids had seen. That wasn't what we wanted. So we went out and took all of them down and the last time I was out there they were still piled up in the corner of the tobacco barn. There were lots of little ecosystems out there—the pond, the stream, the cornfield on the edge, the tobacco field over here and woodland. And we didn't want the students seeing signs saying "This is a dogwood tree." So we took them down.

Two of the teachers that worked on the McNutt Nature Trail started the first School in the Woods in North Carolina. The trail served as a laboratory to get the kids ready for it.

School in the Woods was started in New York State in 1901. An old professor up there would ask his 15 or 20 students from primary level through high school to go live in the woods for a month. This was the first School in the Woods. We were a spin-off from that idea. All the fifth grades from up to five of the Greensboro schools would go down to William B. Umstead State Park near Raleigh and spend a week at Camp Lapihio.

The kids had classes in forestry, soil conservation, wildlife biology, freshwater biology. [Former *Wildlife In North Carolina* editor] Duane Raver would bring his hip boots and his net and go down in the creek below the dam and he'd get clams and fishes and salamanders and teach the food chain.

It was aimed at the science curriculum but we worked to get the entire curriculum involved. The physical education head of the city school system would come down there and play games with them and hold square dances. The kids made their menus, worked their budgets, wrote letters. It was all worked out to cover the entire school curriculum. The last afternoon they had show and tell. The kid had all week to find something that he or she was interested in and to get material to illustrate it. Each kid became an expert on something, and on Friday afternoon each kid showed off. They were totally amazed at the things they were finding.

Of course television has conditioned children now so that they are not as excited as they used to be. It's hard to compete with some of these beautiful television programs when you go out in the woods. The kids are pretty sophisticated when you take them out there. It's changed since the days when you'd take mill village kids out there who had never seen anything.

You know, the last course I taught at the university was one that I dreamed up to goof off on. It was a two-week camping course in field botany. We'd start here in Greensboro at Hagen-Stone Park and get organized into family units of four to seven people. Then we met at Jones Lake State Park in Elizabethtown for two nights, then to Carolina Beach State Park, then to Hammock's Beach State park, then to Cliffs of the Neuse State Park, and then back to Greensboro for the weekend. That was one week. On Sunday we would meet at Hanging Rock, then up on the Blue Ridge Parkway to Doughton Park, then down to Roan Mountain, then to Joyce Kilmer [National Park] and to Copper Hill, and back to Mount Pisgah recreation area for our final exam.

The students learned to like the extremes. You know there are very few species at Hammock's Beach or on top of Roan Mountain. By visiting all these places they discovered that for themselves. How many trees on top of Roan Mountain, for example? Four. It doesn't take long to learn all the trees up there. They had a different problem when they got to Joyce Kilmer. It's at the 2,000-3,000-foot elevation level, and it's virgin forest and there are a lot of species in there. These concepts are so easy when you go from one place to the other and see for yourself.

They didn't collect a specimen. To identify a plant, they sat down next to it with their key and left it there for the rest of the class. There was to nothing destroyed. We worked at each place, lived there so we could get acquainted with it. It goes right back to the idea of the school teacher teaching the kids in the school yard. It was effective teaching and effective learning. I suggested they bring cameras, if they were photographers, sketch pads, musical instruments—however they learned, they were to bring their tools with them. And we had music at night when there wasn't anything else to do. It was a tough way to make a living.

Since I've been retired I've been working on a book and visiting various parks in the southeast. The I.R.S. called an audit in 1983. The first thing I did when I went in was to show my I.D. as a professor emeritus at the University. And that's a lifetime assignment. I said, "I'm still on duty."

The woman who questioned me said, "Now when you are down in Florida in February in the state park in a campground I assume you park your motor home alongside the other motor homes in the campground." I said, "Yes Ma'm." She says, "How much of the time are you working and how much of the time are you on recreation?"

And I just blew up. I said "Lady, I'm 73 years old. I have worked more than 50 years now. I've never been credited with doing a day's work in my life. My family, my friends all tell me that my work is what other people do when they play. I'm out there taking pictures, studying it, writing about it. That's my profession. These others are doing the same thing, but they're on vacation. I'm working like a dog!" ⊠

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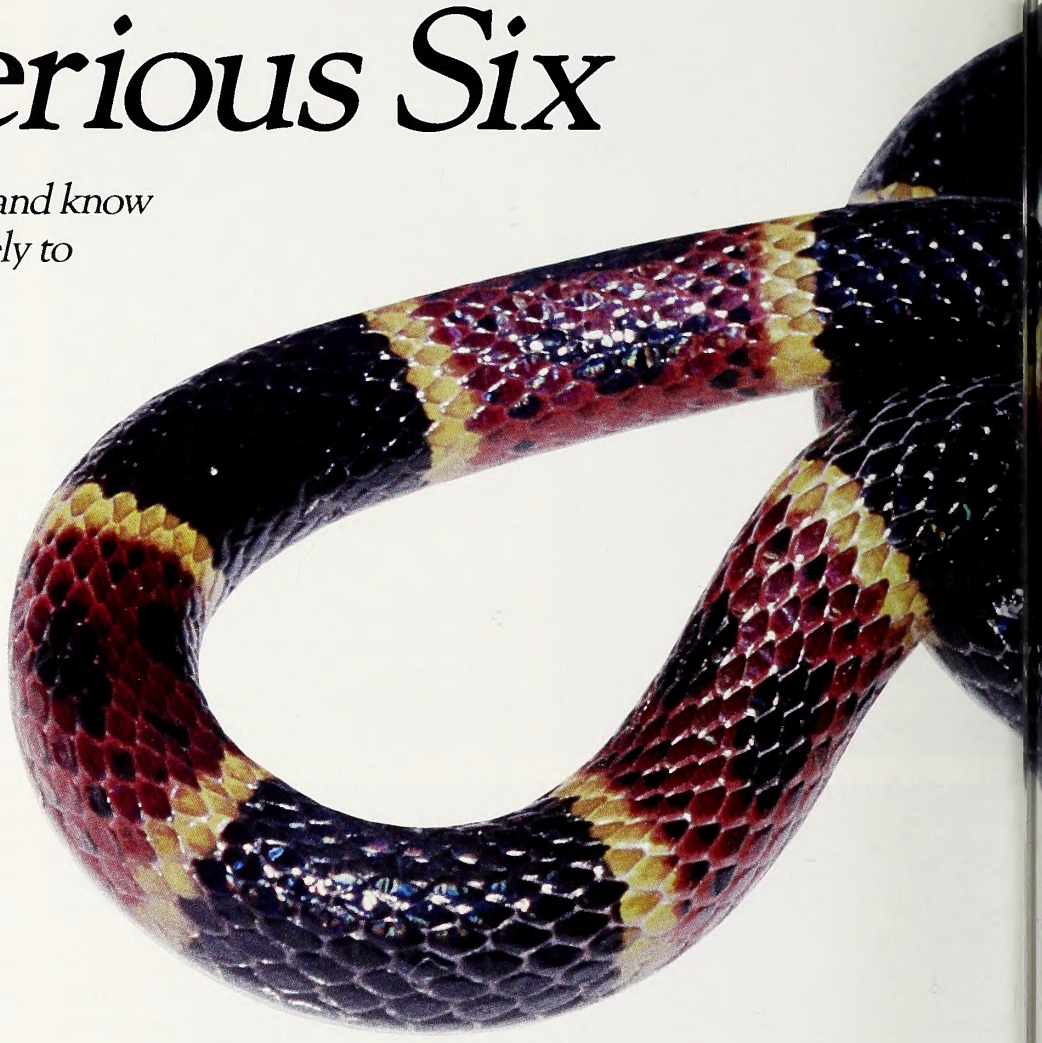
Carolina Profile *is a periodic feature in* Wildlife In North Carolina. *In these interviews, men and women reflect on their outdoor experiences and on what the land and its resources mean to them.*

# The Serious Six

*If you know them by sight and know their habits, you're less likely to be bitten by one of North Carolina's six poisonous species of snakes.*



*by Kay Scott*

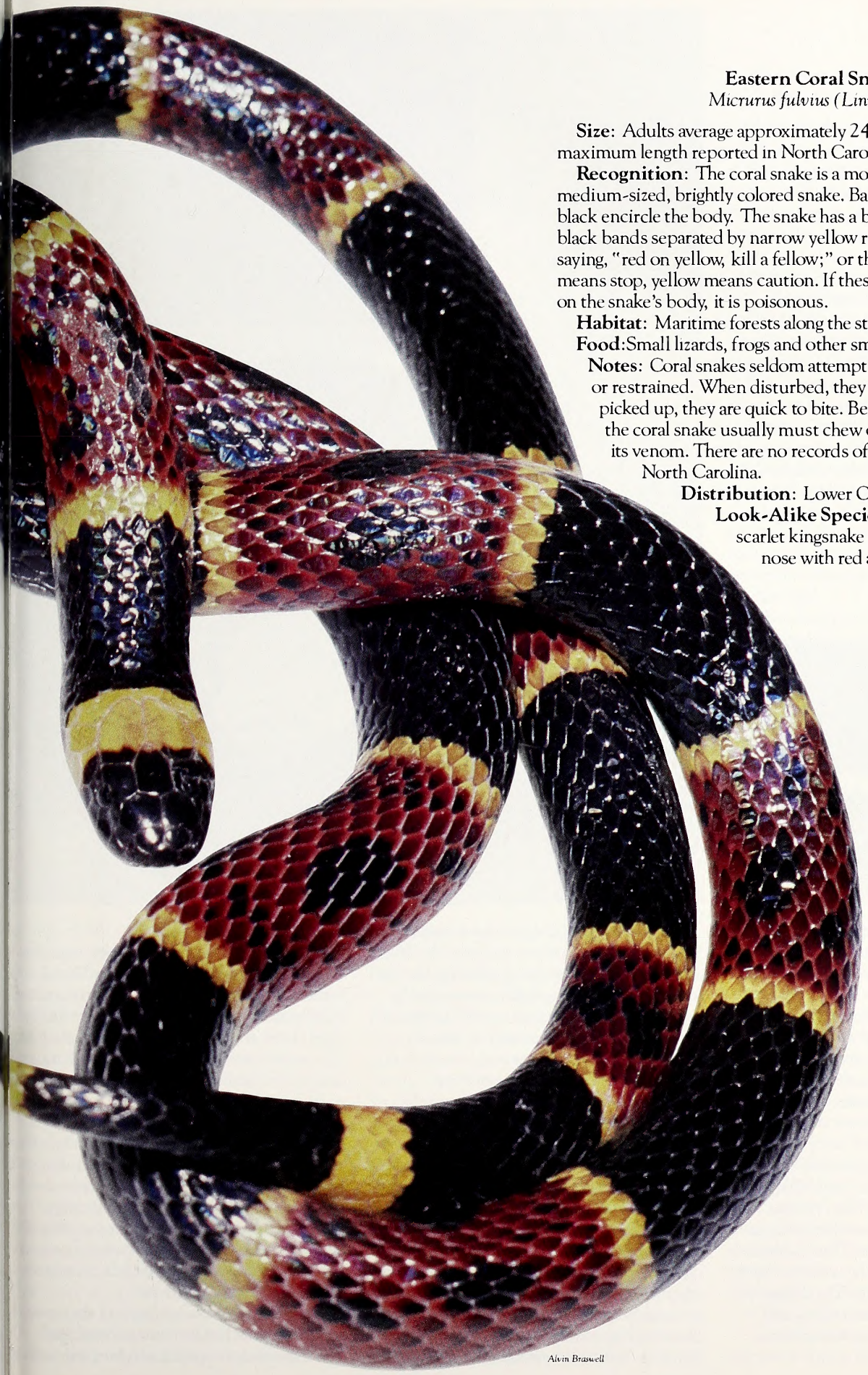
North Carolina has the highest incidence of poisonous snake bites in the country. It's not exactly a matter of pride, but it doesn't mean you're in imminent danger. Even so, it pays to know how to identify poisonous snakes so that you can avoid them.

Thirty-eight species of snakes make this state their home, and six of these species are poisonous. The poisonous species are the eastern coral snake, copperhead, cottonmouth, pigmy rattlesnake, eastern diamondback rattlesnake and timber rattlesnake (the timber rattlesnake classification includes the canebrake rattlesnake, although some authorities group this as a separate species).

Five of these species are known as "pit" vipers. While this graphic term may conjure visions of writhing serpents in rocky crevices, this is not its meaning. The term "pit" describes a sensory organ located between and slightly below the eyes and nostrils. This sensory organ helps the snake to aim and strike at warm-blooded prey. Pit vipers belong to the family *Viperidae*. There are two "moccasins" (the copperhead and cottonmouth) and three rattlesnakes (the pigmy, eastern diamondback and timber) in this group. In addition, all members of this

*Scarlet kingsnake*

Jack Dermid



Alvin Braswell

## Eastern Coral Snake

*Micrurus fulvius (Linnaeus)*

**Size**: Adults average approximately 24 inches long. (The maximum length reported in North Carolina is 34 inches.)

**Recognition**: The coral snake is a moderately slender, medium-sized, brightly colored snake. Bands of red, yellow and black encircle the body. The snake has a black snout with red and black bands separated by narrow yellow rings. Remember the old saying, "red on yellow, kill a fellow;" or think of a traffic light—red means stop, yellow means caution. If these 2 warning colors touch on the snake's body, it is poisonous.

**Habitat**: Maritime forests along the state's southeastern coast.

**Food**:Small lizards, frogs and other small snakes.

**Notes**: Coral snakes seldom attempt to bite unless handled or restrained. When disturbed, they move quickly. If carelessly picked up, they are quick to bite. Because of its small mouth the coral snake usually must chew on a finger or toe to inject its venom. There are no records of this species biting man in North Carolina.

**Distribution**: Lower Coastal Plain and Sandhills.

**Look-Alike Species**: Scarlet snake and scarlet kingsnake (Both species have a red nose with red and black bands touching.)

### Cottonmouth
*Agkistrodon piscivorus (Lacepede)*

**Size**: Approximately 3 feet, but may attain 6 feet in length.

**Recognition**: The cottonmouth is dark gray in color with dark crossbands, although the pattern may vary in color, being almost absent in some larger specimens. The cottonmouth is best known for the tendency to stand its ground when surprised. It will then open its mouth to expose the white membrane and rapidly vibrate its tail.

**Habitat**: Almost any permanent or semi-permanent aquatic area in eastern North Carolina.

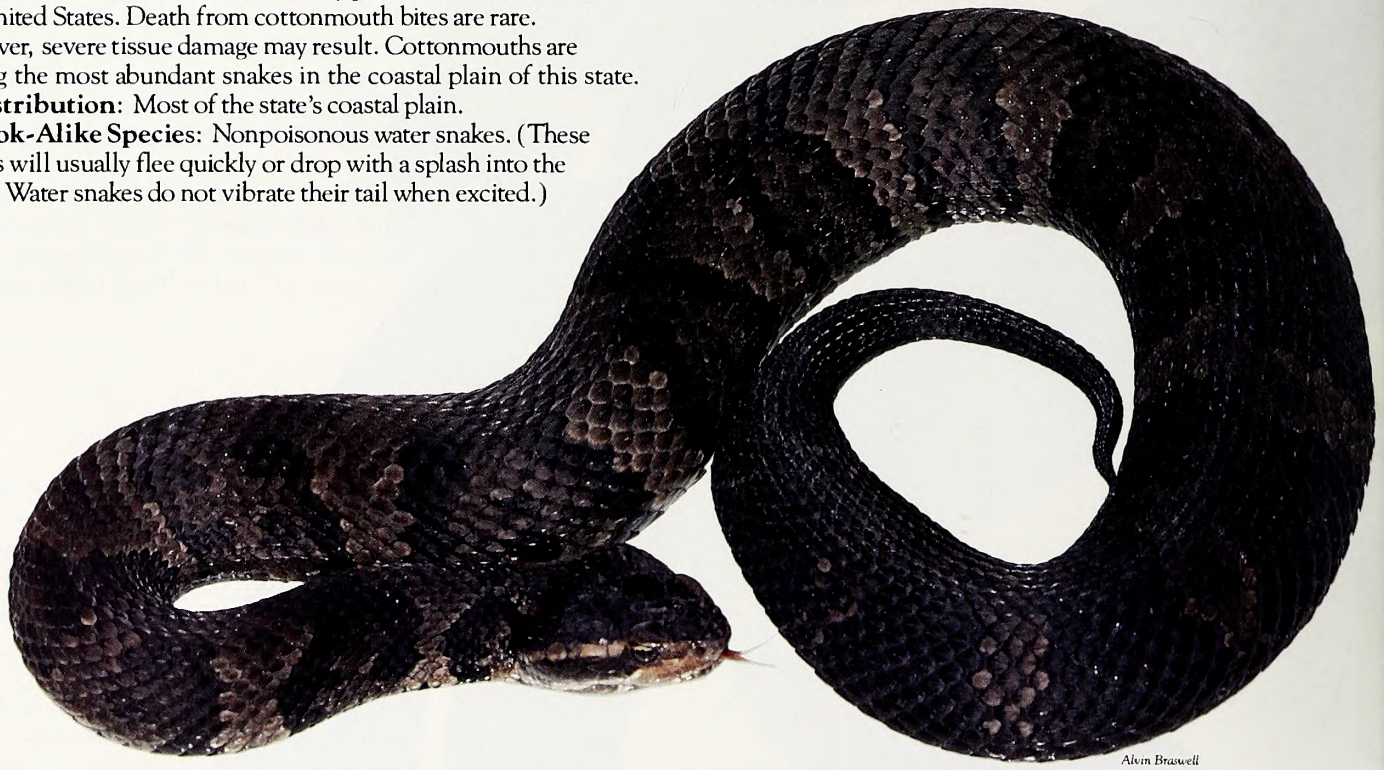
**Food**: Fish, amphibians, reptiles, birds and small mammals.

**Notes**: The cottonmouth is the only poisonous water snake in the United States. Death from cottonmouth bites are rare. However, severe tissue damage may result. Cottonmouths are among the most abundant snakes in the coastal plain of this state.

**Distribution**: Most of the state's coastal plain.

**Look-Alike Species**: Nonpoisonous water snakes. (These snakes will usually flee quickly or drop with a splash into the water. Water snakes do not vibrate their tail when excited.)

*Banded water snake* Jack Dermid



Alvin Braswell

family have a vertically elliptical pupil which may appear as almost round in dim light. They also have a large head, distinctly wider than the neck.

The sixth poisonous species, the eastern coral snake, is a member of the family *Elapidae*. This family includes the notorious cobras, which, fortunately, are not native to the United States. Coral snakes may be identified by the bright pattern of red, yellow and black rings which encircle the body, and are sometimes confused with the harmless scarlet king snake. Coral snakes have a round pupil and no facial pit, and relatively short fangs and small mouths, as do all members of *Elapidae*. This combination makes it difficult for them to bite most parts of the human anatomy. The danger of its bite, however, comes from the potent venom which affects the central nervous system of its victims.

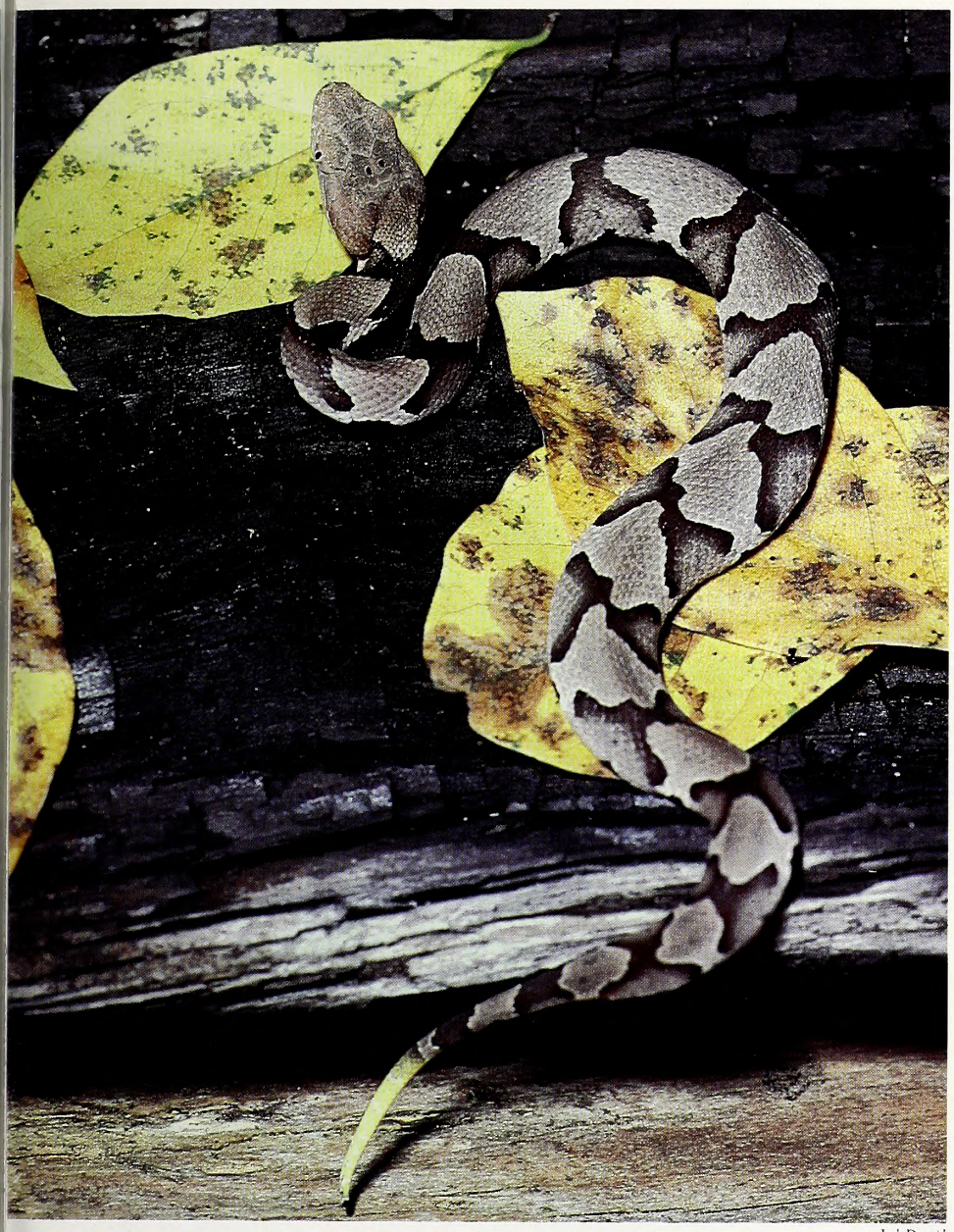
In contrast, the pit vipers have long hollow fangs which serve as specialized teeth. Firmly attached to the upper jaw and hinged to the front of the skull, the fangs automatically rise as the snake opens its mouth. (Likewise, they fold down as the mouth is closed.) These fangs serve to transport venom from the snake to its victim. Venom from *Viperidae* acts to digest tissue. That is, it keeps blood from clotting and tends to aggravate internal bleeding.

The three rattlesnakes are so named because of the horny appendages at the end of their tail. When nervous, these snakes vibrate their tail at about 100 times per second resulting in a characteristic "buzz" or rattle. Surprisingly, the snakes themselves are unable to hear this warning because they are unable to detect airborne sounds. When disturbed these snakes will always rattle; however, it should be noted that they may bite first.

Popular myth says that a rattler's age may be estimated by counting the number of rattles on his (or her) tail, but this is untrue. Rattles are the horny remains of previously shed skins, and a healthy snake may shed its skin on the average of three times per warm season. To further complicate this theory, authorities note that the rattles are loosely attached, and may easily wear off or be pulled off during a snake's normal activities.

Snakes are cold-blooded and their body temperature adjusts to the temperature of their environment. In cold weather they hibernate, and many poisonous snakes will den with other snakes, both poisonous and nonpoisonous, to seek shelter from extreme cold and from their enemies.

Snakes mate in the spring, and the young are born in the late summer and early fall. The five species of pit vipers give birth to live



Jack Dermid

**Copperhead**
*Agkistrodon contortrix (Linnaeus)*

**Size**: Adults range from 24 to 46½ inches.

**Recognition**: The copperhead has a large, moderately stout body with brown or chestnut colored hourglass-shaped crossbands. (Dark crossbands are broad on the sides and narrower above and below.)

**Habitat**: The copperhead ranges throughout the state in a variety of habitats ranging from coastal woodlands and drier pocosins to wooded slopes in the mountains up to 3,000 feet or more in elevation.

**Food**: Small mammals, birds, frogs, insects and, occasionally, snakes.

**Notes**: Probably 90 percent of all venomous snake bites in this state may be attributed to copperheads. Most of these bites occur when people step on or actually touch a snake. The copperhead is a quiet, almost lethargic snake. It is usually content to lie motionless or beat a dignified retreat. Since its venom is relatively weak, bites are seldom fatal.

**Distribution**: Statewide.

**Look-Alike Species**: Usually the snakes confused with the copperhead either have no crossbands or the crossbands are wide on the back and narrower on the sides. Milk snakes (their large markings are wide at the center of the back; belly markings are black and squarish), hognose snakes and water snakes are look-alikes.

young, while coral snakes hatch their young. Even young snakes may be dangerous if disturbed, and the venom of a newborn rattler is three times more concentrated than that of an adult. However, because young snakes are much smaller and have less venom, the bite of a baby snake is not as serious as that of an adult. Within one year its venom will reach normal toxicity.

It is interesting to note that, as with many other wildlife species in North Carolina, the loss of habitat occurring as a result of this state's continuing growth is posing a threat to the population of all snakes. For example, the eastern coral snake is considered a species that warrants special concern by biologists in this state, and the eastern diamondback rattlesnake is considered biologically endangered. The threat to both these species is a direct result of habitat loss.

You needn't kill a poisonous snake to rid yourself of danger. Indeed, even poisonous snakes serve a purpose in the natural world. Poisonous snakes living close to your house or in other areas of human habitation can be discouraged if you simply make your home, your "habitat," unattractive to these poisonous neighbors. Remove any enticing places where they might seek shelter and food. Scrap pieces of tin and boards, rockpiles and even piles of sawdust make an attractive home for snakes. Keep your yard clean and the grass closely clipped. With the frequent use of wood as a fuel in private residences, more woodpiles exist, even in urban areas. Be especially careful when working around the woodpile because this is a favorite home for many snakes. According to the staff of the State Museum of Natural History, there are several other measures which can help you avoid close encounters with poisonous snakes:

- Never place hands, feet or any other part of your body into a concealed place without first checking to see that it is safe. Be especially careful when stepping over or around logs or large rocks.
- Never handle a presumably dead snake until you are certain that it is nonpoisonous. To examine a "dead" snake, use a stick longer than the snake to move it or check it for identification. Be aware that reflex action may cause even a decapitated head to strike.
- Use a flashlight when you move about at night. With the exception of the coral snake, which apparently is active only in the daytime, all poisonous snakes are active both day and night. Particularly during the summer months, many snakes may be more active during the cooler hours or even at night.
- Tell children to leave *all* snakes alone.
- Serious and even fatal bites have occurred during the killing of snakes, there-

Alvin Braswell

**Pigmy Rattlesnake**
*Sistrurus miliarius (Linnaeus)*

**Size**: Average length approximately 15 inches; few exceed 2 feet in length.

**Recognition**: Small, slender-bodied rattlesnake with a tiny rattle. Color ranges from gray to brown or reddish.

**Habitat**: Sandy woods of longleaf pine and scrub oak in the southern and southeastern coastal plain. It is most abundant in the mixed forests of loblolly pine and various hardwoods in the southern Albemarle-Pamlico Sound Peninsula.

**Food**: Frogs, lizards, other snakes and small mammals.

**Notes**: The chance of a fatal bite from this species is almost nonexistent. However, the venom may cause severe swelling and is dangerous because of local tissue damage. When disturbed, the pigmy will usually crawl away. If restrained or otherwise molested, it is quick to bite.

**Distribution**: Sandhills and the lower Coastal Plain north to Beaufort and Hyde counties.

**Eastern Diamondback Rattlesnake**
*Crotalus adamanteus (Palisot de Beauvois)*

**Size**: Adults average 5 feet in length. (Range: 36 to 69 inches.)

**Recognition**: A very large, heavy-bodied snake. It has two diagonal yellow lines on each side of the head enclosing a dark stripe from the eye to the mouth. In addition, it has a large rattle. Dark diamonds on its body are outlined by cream or yellow.

**Habitat**: Flat woodlands interspersed with thick bays or pocosins, and sandy ridges of pine and oak.

**Food**: Small mammals, rabbits and birds.

**Notes**: This is the largest snake in the United States. When disturbed, the diamondback is quick to sound its rattle, to coil and prepare to defend itself. If not molested, the snake will slowly retreat, backing away while still facing the intruder. Its long fangs, readiness to strike and great quantity of venom make it the most dangerous of the poisonous snakes. The eastern diamondback is considered to be an endangered species by biologists. It should not be killed unless human life is in danger.

**Distribution**: It is rare in this state; restricted to the Coastal Plain as far north as Carteret and Craven Counties.

Jack Dermid

Harry Ellis

**Timber Rattlesnake**
*Crotalus horridus (Linnaeus)*

**Size**: Average 3 to 4 feet, but occasionally may attain 6 feet.

**Recognition**: Dark crossbands which break into blotches on the forward body and a chestnut or yellow stripe down the back. Aside from the eastern diamondback, this is the only large rattlesnake in this state.

**Habitat**: Ranges from dense coastal pocosin and low pine flatwoods to rocky mountainsides.

**Food**: Small mammals.

**Notes**: When discovered, this species will usually remain motionless or attempt to crawl away. However, if cornered, it will stand its ground. Bites may be fatal. However, with proper medical attention, chances of recovery are good. Those snakes of this species found in the Piedmont and Coastal Plain are usually lighter in color and average slightly larger than their mountain counterparts. They are referred to as "canebrake" or "swamp" rattlers. Some authorities consider the canebrake rattlesnake to be a distinct subspecies.

**Distribution**: This species is most often found in the Mountains, Coastal Plain and in certain heavily wooded sections of the Piedmont. In earlier times it probably ranged throughout the state.

fore, if a poisonous snake is found away from human habitation, leave it alone. It simply is not true that the only good snake is a dead snake. Snakes have a place in the balance of nature, serving a valuable role in controlling the rodent population.

Should you or someone you know be bitten by a snake, be aware that prompt medical attention will reduce the chances of serous injury. Statistically, there is a greater chance of death from a bee sting or lightning strike than from a snake bite.

The danger from a snake bite depends on several factors including the location and depth of the bite, size of the snake and amount of venom injected. The signs and symptoms of snakebite include extreme pain, characterized by rapid swelling; the presence of one or more puncture wounds created by the fangs; general discoloration of the skin; a rapid pulse; general weakness; nausea and vomiting; shortness of breath; dimness of vision; and/or shock.

If bitten it is recommended that you remain calm and ride to the closest medical facility where antivenom can be administered. This is the most effective treatment and will speed recovery and reduce the possibility of permanent tissue damage. Opinion varies regarding the best treatment for victims bitten while in the field away from prompt medical attention. However, the consensus is that the victim should remain calm and avoid physical exertion. This is extremely important since it will reduce the spread of the venom through the bloodstream. If possible, carry the victim to the nearest transportation. If this is not possible, have the victim walk, not run, to the nearest vehicle and transport to the hospital.

Here are several important "don'ts":

• *Do not* place a tourniquet above or below the bite. This may cause more damage than the snake bite itself.

• *Do not* cut around the fang marks and try to suck the venom out. Again, the possibility of additional nerve and tissue damage caused by incorrect treatment is of concern. The use of commercial snake bite kits is *not* recommended.

The use of constricting bands above and below the bite continues to be debated. (A constricting band is tied just tightly enough to slow but not enough to completely stop the flow of blood. These are never tied for more than 15 minutes. The danger is that these bands may be tied too tightly.)

It is recommended that you consult your local Emergency Medical Service for current procedures since these change as new information becomes available. However, prompt attention by a qualified medical professional continues to be the best treatment. ⊠

# THEY TEACH WILDLIFE, DON'T THEY?

## And that's not all. Resources could become the fourth "R" as schools across the state add special projects and courses to teach appreciation and proper use of our natural world.

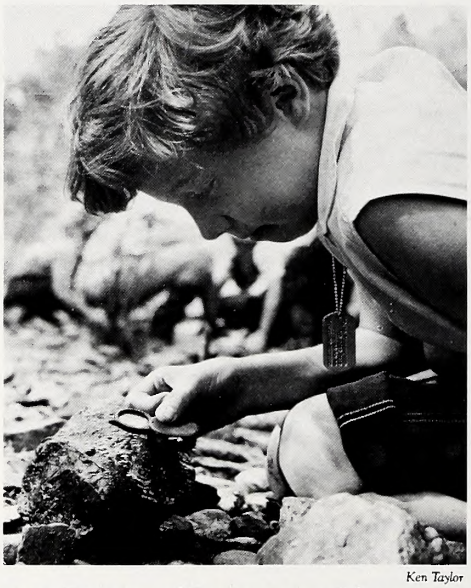
by Rick Estes

When I walked out the back door of the school into the wooded area, I expected to see kids running in all directions, squealing in excitement. Instead, I saw a child sitting quietly under a tree, pencil and paper in hand, apparently in deep thought. Other children were similarly involved, and seemed oblivious to my passing through.

These fourth graders were students at Bugg Elementary School in Raleigh, and they were participating in a wildlife learning activity that was actually their English class for the day. The activity, called "Animal Poetry," asks each student to write a short poem about what it might be like to be a wild animal.

This lesson is not part of the traditional "Three R's," but part of an educational effort to use the fourth R, "Resources," to motivate and teach youngsters. Sometimes the lessons are not always as quiet and contemplative as "Animal Poetry." One class is raising wild ducks in a school classroom, for example. Another takes to the woods for a week with 30 sixth graders. These are but a few of the unusual, but very successful ways some North Carolina teachers are helping their students learn to understand and appreciate wildlife and the environment.

Teaching schoolchildren about natural resources is not new, but much of the recent interest in using natural resources in the classroom and even as a classroom springs from two recent educational programs, CLASS Project and Project WILD. CLASS Project is a national conservation education program created by the National Wildlife Federation and distributed through workshops by the Wildlife Resources Commission's Division of Conservation Education. Project WILD is an interdisciplinary, supplemental environmental and conservation education program for educators of kindergarten through high school age young people. It has been adopted by 35 states, and is also distributed by the Conservation Education Division.



*Ken Taylor*

Sarah Heisel, from Almond Elementary School in Swain County, got her seventh grade students involved in a wildlife habitat project after attending a CLASS Project workshop.

"My students really got interested in wildlife, and particularly ducks, after we visited a local man who raises ducks," she said. "He gave us some duck eggs to hatch and raise. We didn't know what kind of ducks they were, but we hatched the eggs in an incubator in our classroom, and then moved the little ducks to a brooder pen right in the school. Finally, when they were big enough, one of the boys moved them to a pond on his family's farm."

Eventually, all but one of the ducks flew away with other wild ducks from the area. However, Heisel said that the students learned much more than how to raise and release ducks.

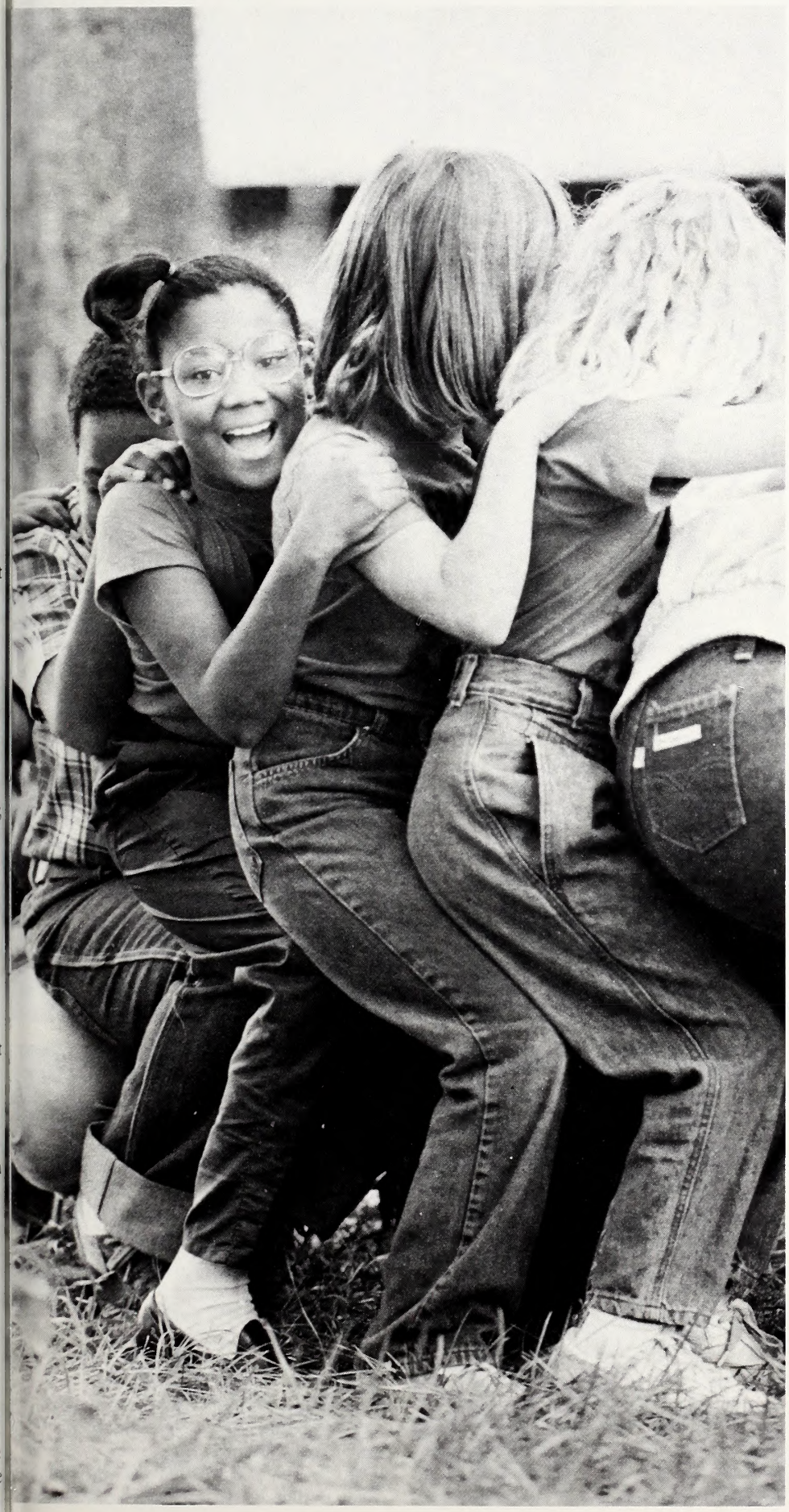
"We built and erected bird feeders and bird nesting boxes all around the community, and the students really began to see their role as stewards of wildlife for the future," she said.

Sarah Heisel would like to see more teachers get involved with their students in CLASS Project and similar programs that help teach youngsters about natural resources. "I think most teachers would learn how easy it really is to teach some of these conservation lessons because you don't have to be an expert," she explained. "Once you get some of these things started in the classroom, the students take the lead and you can stand back and let them go."

In addition to the satisfaction she got from seeing the students' involvement, Sarah Heisel also became certified as the state's first CLASS Project classroom teacher. She shared the certificate from the National Wildlife Federation with her students.

While CLASS Project is a relatively new program, other special natural resource studies have been going on in some of our schools for many years.

An "environmental education" school camping program that has been running for several years began in Jackson County in the early 1970s. Originally held at the Deer Lake facility in the Pisgah National Forest near



News and Observer/Scott Sharpe

***Education games are fun*** *and help make nature studies come alive for elementary school students (left), but solo encounters between the child and nature are still the cornerstone of a good outdoor education program (facing page). Programs that stimulate wonder and curiosity about the environment will give the child a lifelong interest in nature.*

Asheville, the camping programs now take place at Camp Merriewood, a privately owned facility near Cashiers.

Following a two- or three-year period of dormancy, the program was revived when Jackson County's seventh and eighth grade teachers attended the state's first Project WILD workshop in August 1984. Junior high students, their teachers and natural resource agency personnel spend three days and two nights at Camp Merriewood studying nature through activities that include all the basic curriculum subjects.

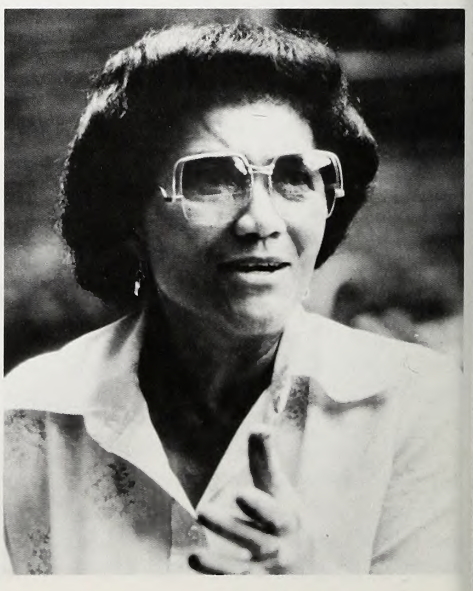
The camp facilities are donated to the schools during several weeks in late spring and early fall when regular camp groups are not present. The agenda that the teachers and students follow while at camp was worked out jointly by personnel from Western Carolina University, Jackson County Public Schools, the Wildlife Resources Commission, and the Soil Conservation Service.

Students sharpen their math skills through a Project WILD activity called "How Many Bears Can Live in this Forest?" At the same time they learn something about the carrying capacity of wildlife habitat. They practice through "Animal Poetry," another WILD activity. Physical education, music, social studies and science are all taught using Project WILD activities. The students also investigate the stream, woods, and fields at camp with the guidance of natural resource personnel.

It is not necessary to leave the school campus or even to go outdoors to include natural resource education in the school curriculum. At Bugg Elementary School in Raleigh, all the teachers in kindergarten

**Teachers like** *Jan Wise (left) from Woodleaf School near Salisbury are finding ways to improve the learning experience for their students. Woodleaf sixth graders have been having school outdoors at Umstead State Park near Raleigh for over eight years. Resource specialists are an important part of many schools' outdoor studies programs. Bea Blount (right) with the Resource Center in Salisbury, assists teachers throughout the school system with nature studies.*

Jay Dawes

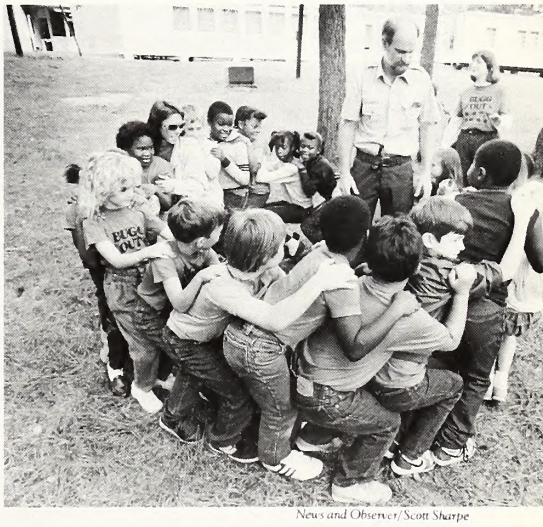


Jay Dawes

Rick Estes

***Children "become"*** *the components of habitat in a game that teaches how people can have an impact on their surroundings. Such activities encourage student participation and increase understanding.*

***Project WILD activities*** *like "Habitat Lap Sit" are fun and teach concepts such as the importance of arrangement of food, water and shelter in wildlife habitats. Rick Estes with the Wildlife Resources Commission and Gina Pulley, science teacher at Bugg Elementary School in Raleigh, help other teachers learn to use WILD activities to teach their classes.*



News and Observer/Scott Sharpe

through fifth grades taught their classes using Project WILD activities on "WILD Day at Bugg" last fall.

Even high school biology classes can learn from WILD lessons. At Raleigh's Millbrook High School, biology teacher Suzanne Cooper taught population dynamics using "Oh! Deer," a simulation game involving students as white-tailed deer and the components of habitat. Betty Ann Welsh and Edna Eason adapted another WILD activity to help their Millbrook students learn how single-celled organisms are able to carry on the necessary life functions in their microscopic world.

At Sadie Saulter Elementary School in Greenville, students, teachers, and parent volunteers celebrated what they hope will become an annual event. "All Species Day" was held last year to draw attention to the special needs of our endangered wildlife, but also to make youngsters aware of the needs of all wildlife. The day included slide and puppet shows, art contests, live animal demonstrations, and a school-wide parade with students dressed as different animals. "The student interest in 'All Species Day' was fantastic, and they're already looking forward to next year's events," said Amy Hannon, a parent-volunteer who helped coordinate the event. The idea for "All Species Day" came from a story about a school in Texas that had held a similar program, and from a CLASS Project workshop that some Sadie Saulter teachers had attended.

Why would all these teachers, and the hundreds of others we haven't mentioned, put forth the extra effort that's required to run these natural resource programs? With today's emphasis on teaching the basics, why do these educators take the time to teach kids about wildlife and the environment? Jan Wise, a sixth grade teacher at Woodleaf School near Salisbury, has an answer to these questions. Woodleaf administrators, teachers and other staff members have been taking their sixth grade classes to Umstead State Park near Raleigh for a week-long nature study for over 10 years.

"The natural resources are everybody's future," said Ms. Wise. "No matter what career a youngster eventually enters, his work and his whole life depends on the resources of nature. In fact our understanding and appreciation of nature is the real basis of all education. After that, we should teach English, history and math. Whenever a natural object or concept is the center of study in the classroom, the student interest is there. That interest can be used for motivation to teach the other subjects."

Those ideas are important to all of us whether we are professional educators, environmentalists, or hunters. The next generation faces some tough choices about the environment, probably even tougher than those we face now.

Chief Seattle of the Suquamish tribe advised us 130 years ago: "Teach your children what we have taught our children... that the earth is your mother. Whatever befalls the earth, befalls the sons of the earth. Man does not weave the web of life, he is merely a strand in it."

Teaching an appreciation of our natural resources — the "Fourth R" — is not only our best hope; it is our only hope.⊠

*Public Hearings This Month*

## Wildlife Research Area Proposed At Hoffman

*Written and Edited by Mark Taylor*

A wildlife research and demonstration area may be established at the Sandhills Game Land in the future. This was one of the proposals adopted for presentation at public hearings by the N.C. Wildlife Resources Commission. After considering public comment, the Commission will adopt the final regulations at its April meeting.

The proposed Hoffman Game Research and Demonstation Area would include the Gordon Field Trial Area and adjacent lands north to Naked Creek. The 8,500-acre area would be closed to all public hunting for three years while wildlife populations there are studied. Present field-trial activities, however, would be permitted. Also, the remaining 51,000 acres of the Sandhills Game Lands will remain open to hunting.

Small-game research would be designed to help stabilize quail and rabbit populations, and develop management techniques to increase their numbers. Habitat, food needs, disease, predation and other factors could be examined. Research on deer would also be conducted at the site. Genetic research could focus on such things as the control of disease and birth defects and developing strategies to improve the size and quality of deer. A food and habitat study of deer might also be conducted as well as other research including studies on stocking and establishing wild turkey populations.

This proposal was unanimously endorsed by the Wildlife Resources Commission for presentation at the upcoming public hearings. According to Allan Miles, Wildlife Commissioner in District 6, and introducer of the proposal, "We are really excited about what this can mean for the wildlife of our state, and it comes as a direct result of concerns which sportsmen from across the state have voiced. As further plans are developed, we will be getting word out."

A mandatory check system—where hunters are required to check in and out and report their harvests at check stations—is proposed for three game lands. All hunters (except raccoon and opossum hunters hunting at night) would be required to report to check stations on the Sandhills Game Land. All deer hunters would be required to report to a check station on the Thurmond Chatham Game Land, and only gun hunters for deer would be required to report to a check station on the Bladen Lakes State Forest Game Land (This would not apply on the Breece and Singletary tracts).

Other possible regulations changes involve a proposal to eliminate the season limit for quail while reducing the daily bag limit from 10 to eight birds, and a proposal to establish a deer season running from November 17 through January 1 in the portion of Harnett County east of U.S. 401 south of Lillington and west of the Cape Fear River. Minor calendar adjustments will also be made in many seasons which will basically be the same as last year.

These proposals will be presented at an upcoming series of public hearings on proposed hunting, fishing and trapping regulations for the 1986-87 seasons. All hearings begin at 7 p.m., and the schedule is as follows:

- March 17 at the North Stanly High School in Albemarle;
- March 18 at the Courthouse in Asheville;
- March 19 at Surry Community College in Dobson;
- March 20 at the Junior High School in Morganton;
- March 24 at the Courthouse in Elizabethtown;
- March 25 at the Alamance County Courthouse in Graham;
- March 26 at the Old Courthouse in Edenton;
- March 27 at the Courthouse in New Bern;
- April 1 at the Courthouse in Goldsboro.

Luther Partin

***A Closer Look:*** *A study of declining quail numbers is one of the research projects that could be undertaken at the proposed Hoffman Game Research and Demonstration Area.*

*Order One Today*

## Sportsman's Print Features Largemouth

***Fish Of Your Dreams:*** *The 1986 North Carolina Sportsman's stamp and art print features this painting of a largemouth bass by Duane Raver, a well-known wildlife artist from Cary who was editor of* Wildlife In North Carolina *for many years. Orders for this limited-edition print will be taken through June 30, 1986. For more information write PRINTS, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.*

*Learned From Live Decoys*

## Currituck Woman Top Goose Caller

The honking of wild geese and muffled quacking of ducks was enough to set any duck hunter's heart racing. Yet, these hunters were not crouched around some remote salt marsh. The occasion was the 1985 North Carolina Duck and Goose Calling Contest which was part of the recent fourth annual Currituck Waterfowl Festival.

Competitors competed in five categories in either junior or adult divisions. In the adult division, Erleen Snow from Powell's Point won the goose calling contest while Watson Stuart of Bell's Island won the duck calling and swan calling contests. In the junior division (16 and under), Robert Lewis of Bell's Island won the duck calling contest and Jason Smith of Currituck won the goose calling contest.

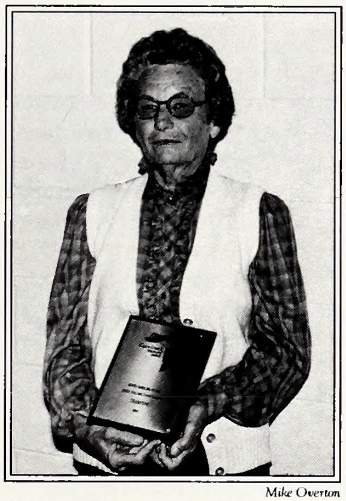
Erleen Snow, the first woman to ever compete in the goose calling event, is a native of Currituck, and lives at Powell's Point with her husband, Jarvis Snow.

"I used to go goose hunting with my father every chance I got when I was growing up," she said. "During those days we used live geese for decoys. I learned how to call by listening to them."

In the contest, goose callers were to imagine a flock of geese that they had spotted a half-mile away. The caller entices the geese toward his blind, but the flock flies past out of range. The caller turns the flock back to the blind. Calling could not exceed a minute and a half for adults and 45 seconds for juniors.

In the duck calling contest, callers simulate a mallard using the hail or long distance call, mating or "lonesome" duck call, feed or chatter call, and a comeback call. In the swan calling contest, contestants duplicate the call of a wild swan with their own voices.

—*Mike Overton*



Mike Overton

***A New First:*** *Mrs. Erleen Snow of Powell's Point is the new state champion goose caller. She is the first woman to enter the duck and goose calling competition at the annual Currituck Wildlife Festival.*

*Fishing Is Good*

## Crappies Moving In

Cold weather got you down? Why not try crappie fishing. Warm spells are an excellent time to catch crappie, especially when they begin moving into the shallows to spawn in March and April.

The best fishing is usually found around stumps or brushpiles, flooded timber, rocky causeways, and coves. All you need are a few shiners or minnows, corks, and small hooks. Small spinners and lures also work well. If you're not sure where to go, ask at your local bait shop or sporting goods business.

—*Lawrence Musselwhite*

*Peregrine Restoration Is Typical*

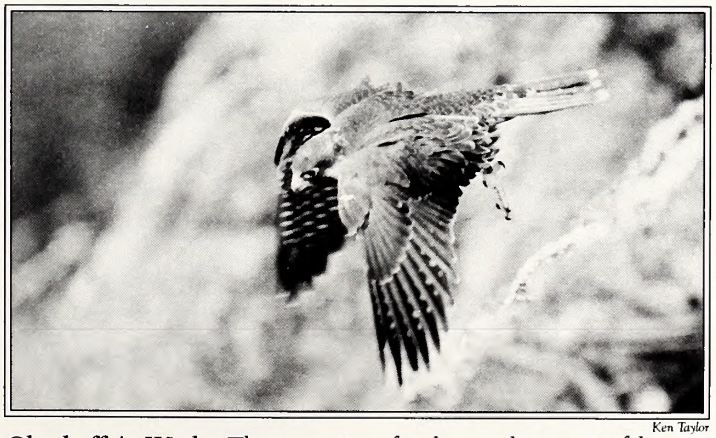
## Tax Checkoff Helping Nongame Wildlife

If you'd like to help restore an endangered species such as peregrine falcons to North Carolina, or would like to help young people learn more about wildlife and conservation, now is your chance. All you have to do is contribute to the North Carolina Nongame and Endangered Wildlife Fund through a checkoff on the 1985 state income tax form. Information on how to contribute is found on page 3 of the instructions accompanying form D-400, and contributions are made on line 23. You may contribute a portion or all of your refund (but not less than $1), and may deduct this contribution from your income the following year.

Last year, over 32,000 North Carolinians contributed approximately $300,000 to nongame projects through this checkoff. These contributions supported continued restoration projects for endangered bald eagles and peregrine falcons, protection of threatened loggerhead sea turtles, management of colonial waterbirds, introduction of Project WILD and CLASS Project into the schools, and helped purchase unique bottomland hardwood forests along the Roanoke River.

"We're proud of the accomplishments of the nongame and endangered wildlife program, and grateful for the support we've received from the citizens of North Carolina," said Debbie Paul, supervisor of the Wildlife Commission's Youth Activities and Environmental Quality Section. "However, to continue this work we need your help. The future for nongame and endangered wildlife projects in North Carolina depends on how citizens fill out their tax returns in the next few weeks."

If your tax returns are prepared professionally, tell your accountant that you wish to contribute to the Nongame and Endangered Wildlife Fund. If you aren't receiving a refund but would like to support this program, tax-deductible contributions may be sent to the Nongame and Endangered Wildlife Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.



Ken Taylor

***Checkoff At Work:*** *The restoration of endangered peregrine falcons is one of many projects supported by a checkoff for the North Carolina Nongame and Endangered Wildlife Fund on state income tax forms. Information on contributing to the checkoff is found on page 3 of the instructions accompanying your tax return.*

*Slow-Trolling Bags 79 Pounder*

## State Record King Mackerel Caught Off Cape Lookout

Clifton Moss

***Good Day's Fishing:*** *Clifton Moss of Atlantic Beach recently landed this new state record king mackerel off Cape Lookout while fishing with Louis Taft of Greenville. The fish weighed 79 pounds.*

Clifton Moss of Atlantic Beach is no stranger to big fish. The private fishing boat captain is known up and down the North Carolina coast for his ability to catch big king mackerel, and it was no surprise when he shattered the state record last fall.

Moss was slow-trolling live menhaden over the Atlas Tanker wreck about 12 miles off Cape Lookout when the big fish hit. After a 45-minute fight on 20-pound test line, he landed a 79-pound king mackerel. The fish was 63½ inches long and had a 28-inch girth.

"There was a dangling treble hook trailing behind the bait which disqualified this fish from the International Game Fish Association records," said Moss, who for almost a year held the IGFA world record king in the 16-pound line class with a 41 lb.-8 oz. fish he caught in 1982. "The all-tackle world record for kings is 90 pounds. If it hadn't been for that dangling treble hook, this fish could have been submitted as the second largest king taken in the world on any line class."

In addition to catching a record fish, Moss and his companion, Louis Taft of Greenville, had a great day. They caught 14 other king mackerel, and four of the fish weighed over 40 pounds.

The former state record king weighed 69 pounds, and was caught off Cape Hatteras in 1978 by William Chipman, Jr.

*Build A Backyard Den*

## Simple Shelters Protect Wildlife

Wildlife needs shelter, and you can easily provide small animals with artificial dens using a few odds and ends found around the home or farm.

An attractive backyard den for wildlife can be made with a few small stones and a large, flat stone, piece of slate, or sheet of metal. Place the flat stone or metal on top of several rocks, and then cover the structure with earth. Planting the den with native grasses, flowers, or perennial plants will make it appear more attractive. Be sure to place the den in an area where there is good cover nearby.

Bits and pieces of old irrigation pipe or drain can also be used for burrows. Bury an end of the pipe in the ground. Lengths of pipe placed in brushpiles will also be used by rabbits.

*Another Successful Graduate*

## "Missing U" Alumni Report

My husband and I are avid deer hunters in Brunswick County. He belongs to the McMillian Hunting Club along with several other men. One of those men, I'll call him Jimmy, must have read Terry Shankle's recent article on "How To Miss Your Deer." Here's the story.

Jimmy was riding around on the hunting club looking for some dogs he still had out from that day's hunt. It was after sundown, and he'd unloaded his shotgun. He found his dogs and went home.

The next morning, Jimmy joined the other club members to hunt one of their favorite blocks of woods. They had found a big track and put the dogs on it. Everyone took their stands and waited for the dogs to jump the deer.

After awhile, Jimmy heard the dogs heading straight for him. He started getting himself mentally prepared when the deer came into his view. It was an easy shot, and Jimmy just knew he had a big mount to hang up on his wall. He threw up his shotgun, popped the safety, aimed, and pulled the trigger... click. It was at that moment when he remembered that he'd forgotten to reload his shotgun.

The hunter on the next stand said he saw Jimmy throw up the gun to shoot and then he just threw down his gun and stomped his feet.

I'll bet he did more than just stomp.

*—Mrs. Cindy Stanley*
*Shallotte*

*Ideal Recipe For Spring*

## Black Pot Stew Is Freezer Cleaner

A freezer full of odds and ends is an intimidating sight, and one of the best ways to use up assorted rabbits, squirrels, deer meat, and the frozen and canned produce from last summer's garden is to make a "black pot stew." This dish is so named because it is best made outdoors in the type of large, black, iron pot used for making soap or scalding hogs.

Susan Sharpe of Hamlet contributed this recipe, and it will feed a multitude. "This recipe makes about 40 quarts, but you can make more or less depending on the contents of your freezer," she said. "We make a stew every year, invite all the neighbors over, and still freeze about 30 quarts."

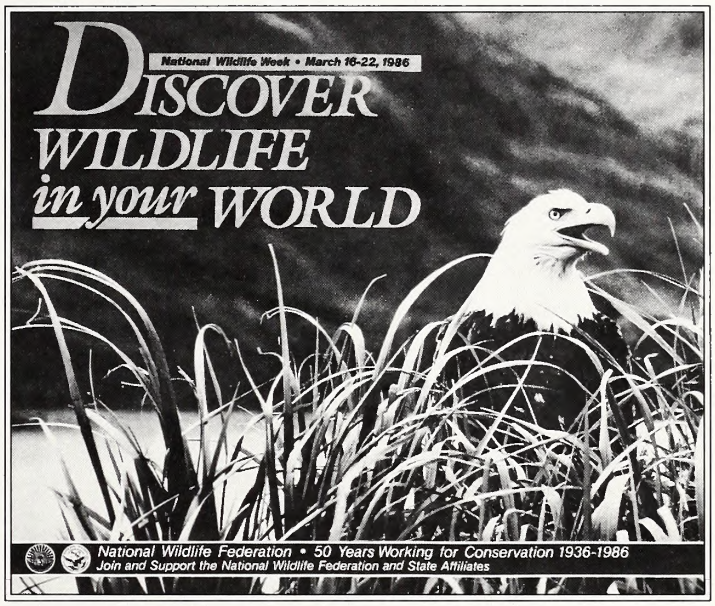
**Black Pot Stew**

*4-6 squirrels and/or rabbits (use more or less depending on what you have)*
*4 large hens*
*15 pounds deer stew-meat*
*12 quarts tomatoes*
*20 pounds potatoes*
*6 quarts corn*
*6 quarts lima beans (canned lima beans are less trouble than dry beans)*
*5 pounds onions*
*2 pounds butter*
*1 cup sugar*
*salt and pepper*
*4 pods red pepper*

Cook meat until tender, and debone the squirrels and hens. Reserve hen broth. Peel and dice potatoes, onions and tomatoes. Grease a large stew pot with lard, and place on low heat. Start with hen broth and add meat, lima beans, onions, tomatoes and potatoes. Cook approximately 6-8 hours or until meat and potatoes fall apart. Stir constantly. Add water if the stew cooks down too fast. Add corn and seasonings last, and season to taste. Eat hearty!

*Held From March 16-22*

## Celebrate Wildlife Week




***Out There And Waiting:*** *"Discover Wildlife In Your World" is the theme of National Wildlife Week, which will be observed from March 16-22. The annual event is sponsored by the National Wildlife Federation, now celebrating its 50th anniversary. Posters and teaching packages are available from Wildlife Week, National Wildlife Federation, 1412 16th St., NW, Washington, D.C. 20036.*

*Annual Event*

## Replace Fishing Line

The warm days of March mark the beginning of the fishing season, and one of the keys to bringing home the first big fish of the year may be a little preventive maintenance.

In particular, pay attention to your line. Used line is full of unseen nicks and abrasion that may result in the loss of a big fish. Line is also weakened by knots and ultraviolet rays. The solution? At least once each year (preferably at the beginning of the season), put new line on your reels. There's a better chance of landing the big one that's sure to strike any day now.

## The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

**Status on November 31, 1985**

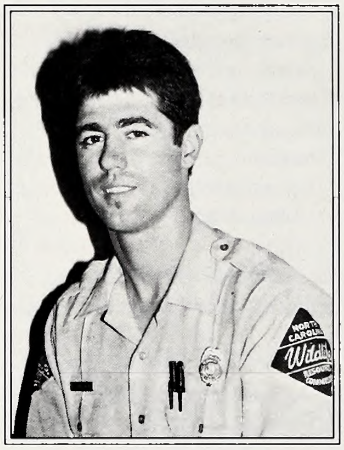
| | Numbers Sold | Revenue Received |
|---|---|---|
| Lifetime Sportsman's License | 15,274 | $4,595,506.90 |
| Lifetime Hunting License | 127 | 24,617.13 |
| Lifetime Fishing License | 918 | 161,957.35 |
| Lifetime Subscriptions to Wildlife in N.C. | 638 | 75,657.27 |
| Contributions | — | 65,345.61 |
| | Fund Total: | $4,926,084.26 |

*Honored By Commission*

## Accident Claims Wildlife Enforcement Officer

February's article on the close calls of wildlife enforcement officers, entitled "Near Misses," details some of the hazards of wildlife work. Shortly after the article went to press we learned of the tragic death of one of our wildlife officers. On December 4, William A. Williamson, a 32-year-old wildlife enforcement officer from Kenansville, was killed in an automobile accident while answering a call for assistance. Williamson was a native of Stantonsburg, and had served with the Wildlife Commission since 1983. At its December meeting, the Wildlife Commission adopted a resolution honoring him.

"Bill Williamson was an effective and hardworking wildlife officer who enjoyed his work and was well-liked by his fellow wildlife officers, other law enforcement officers, and the citizens of his work area," said Jerry Wright of Jarvisburg, chairman of the Wildlife Commission. "He was also active in the Wildlife Commission's hunter-safety program and in civic affairs in Kenansville. This tragic accident is cause for deep sorrow among his many friends, associates and family. We wish to pay tribute to his contributions to wildlife conservation in North Carolina, and offer our deepest regrets and condolences to his family."



***Tragic Loss:*** *Wildlife enforcement officer William A. "Bill" Williamson of Kenansville was recently killed in an automobile accident while answering a call for assistance. He is the sixth North Carolina wildlife officer to die in the line of duty.*

*Nursery Area Protected*

## Conservancy Saves 800-Acre Marsh

The Champion McDowell Davis Foundation of Wilmington recently donated an 800-acre salt marsh to the North Carolina Nature Conservancy. The marsh lies between Figure Eight Island and the mainland of New Hanover County, and is located about 15 miles north of Wilmington.

Management of the area—known as the "Figure Eight-Porter's Neck" marsh—will be a cooperative effort of the Nature Conservancy and the Northeast New Hanover Conservancy, a private conservation organization based on Figure Eight Island.

The marsh serves as a primary nursery area for many species of fish and shellfish. Shorebirds and waterfowl also use the area.

The N.C. Nature Conservancy is a nonprofit conservation organization dedicated to protecting unique natural areas in the state. For information on its programs, write N.C. Nature Conservancy, P.O. Box 805, Chapel Hill, NC 27514.

*Outstanding Service Record*

## Wildlife Officer Honored

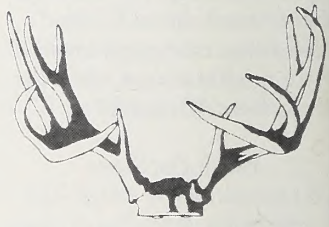
***Top Hand:*** *Sergeant Dennis Thompson (right) of Henderson was recently named Wildlife Enforcement Officer of the Year for North Carolina at the annual meeting of the Southeastern Association of Fish and Wildlife Agencies. Here, he accepts a plaque from George Roberts, chief of the Division of Law Enforcement of the Kentucky Department of Fish and Wildlife.*

## Calendar Of Events

**March 1-2**
Charlotte Woodcarving Show and Competition at the City Park Center in Charlotte.

**March 6-9**
The Great Outdoor Sport Fishing and Travel Show at the Civic Center in Raleigh.

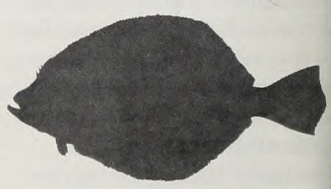
**March 7-9**
Dixie Deer Classic at the North Carolina State Fairgrounds in Raleigh. Features displays of hunting equipment, seminars on deer hunting, and competition for best mounts.



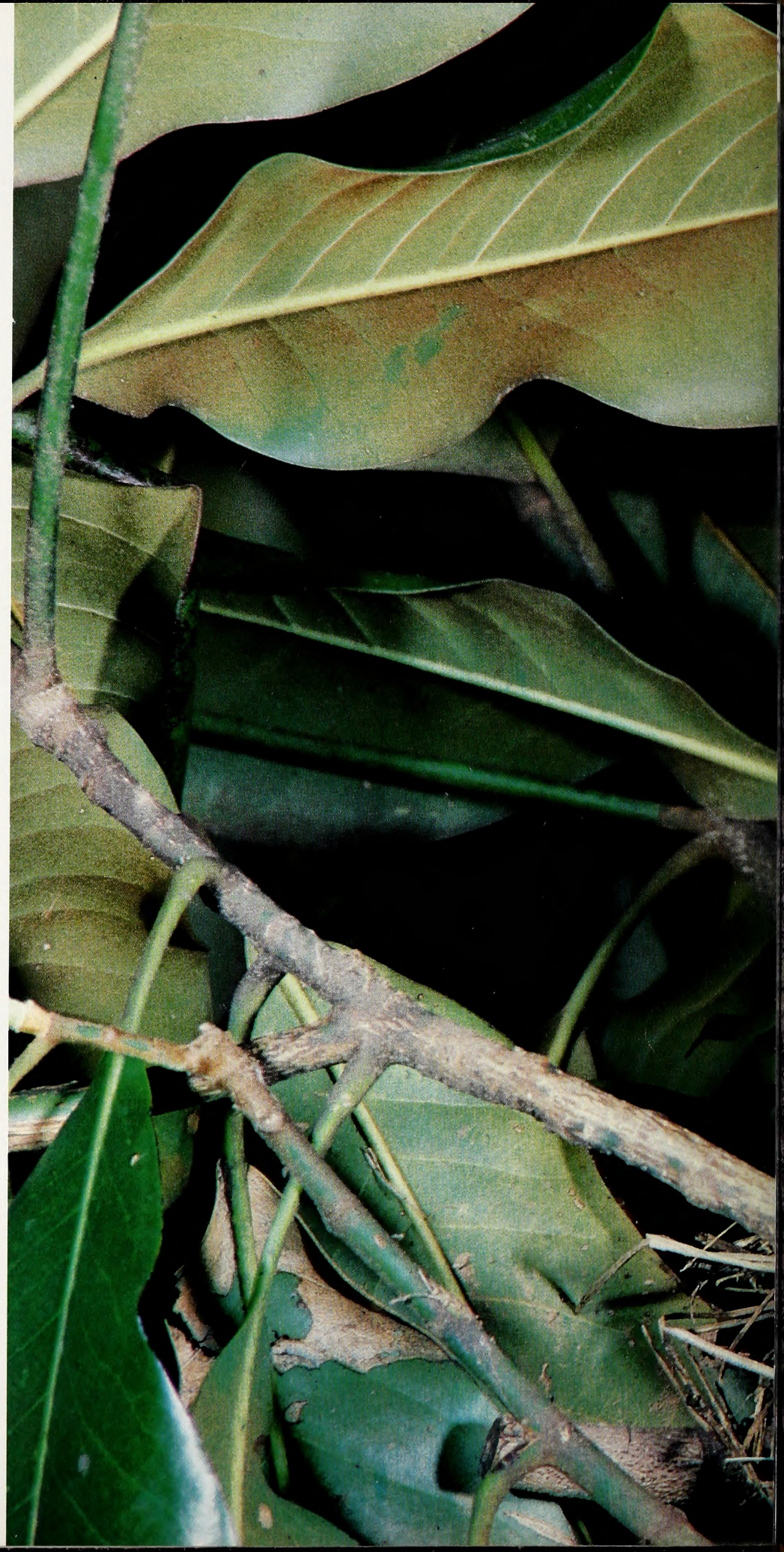
**March 14-16**
North Carolina Commercial Fishing Show at the Crystal Coast Civic Center in Morehead City. Displays of boats and commercial fishing gear.

**March 15-16**
205th anniversary of the Battle of Guilford Courthouse at the Guilford Courthouse National Military Park in Greensboro.

**March 22**
Battle anniversary program at the Bentonville Battleground State Historic Site in Newton Grove. Civil war encampment, living history demonstrations, and other events.



*Irene Sacilotto*



## Feeding Time

Baby robins seem to be all mouth, and no doubt the parents wonder if they ever close them. Earthworms and insects are most commonly on the menu.

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# WILDLIFE IN NORTH CAROLINA

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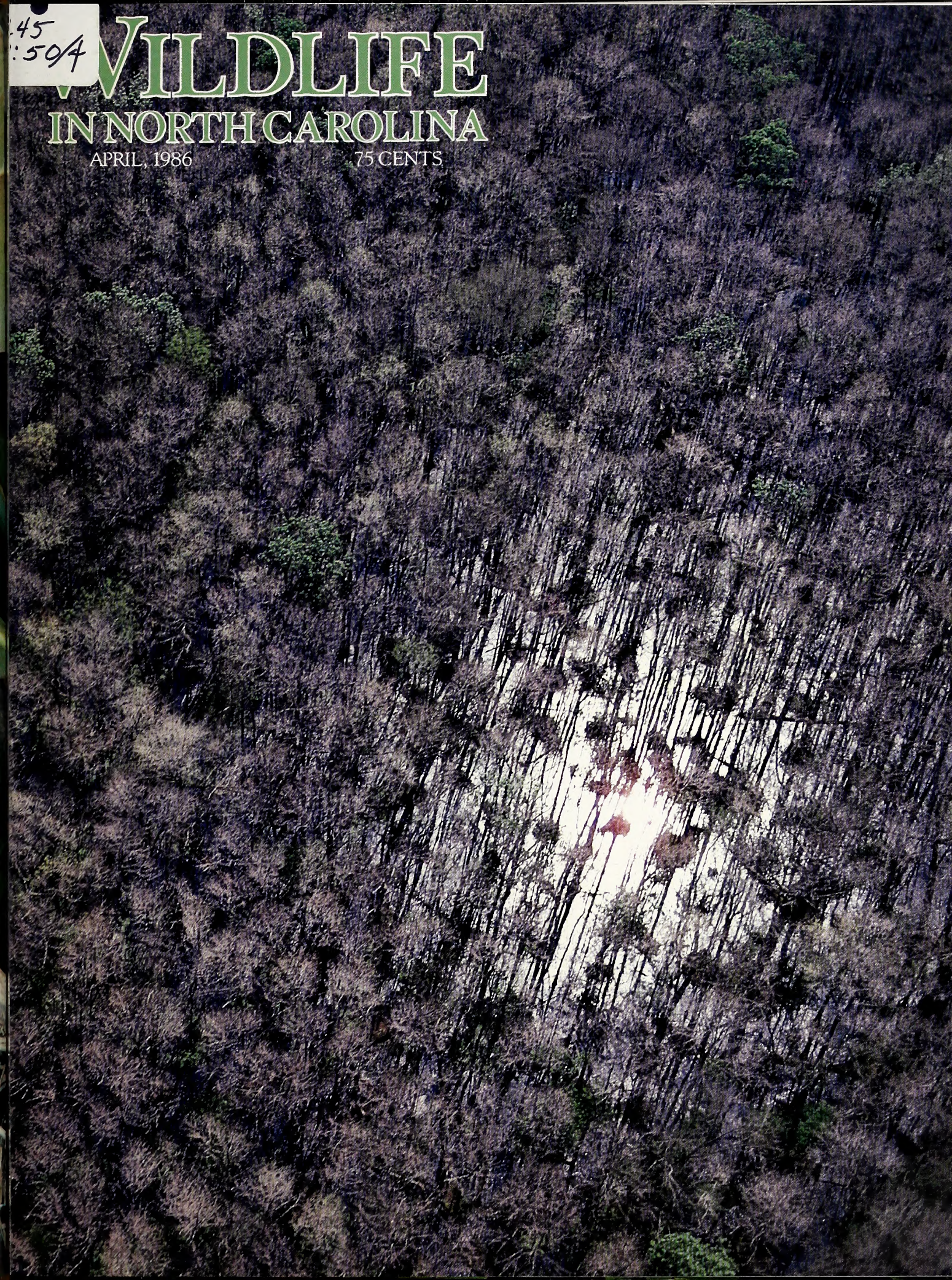


# How To Get Unhooked

*by Jim Dean*

Those who are supposed to know about such things tell us that fish don't have any nerves in the tough cartilage around their mouths which means that they feel no pain from a hook. Fishermen, on the other hand, don't have any cartilage around their mouths and not much anywhere else. A hook embedded past the barb in an angler is invariably noticed immediately.

Some fishermen seem to lead a charmed life and seldom, if ever, get hooked. Yet, sooner or later it seems to happen to everyone who fishes regularly, and getting the hook out with a minimum of pain is no laughing matter. Until a few years ago, the usual technique was to attempt to push the barb through until it protruded, then cut it off with a pair of pliers or snips. Failing that, some anglers cut the hook out. Both techniques are painful, and there is considerable risk of infection. Many times, the only solution has been to go to a hospital emergency room where the pain and lost fishing time was further complicated by unwelcomed expense.

In the late 1970s, however, a new technique was developed that requires no cutting or pushing, and rarely any professional medical attention. Indeed, it is almost painless and bloodless, and because it can be performed on the spot, there is no lost fishing time (an important consideration, certainly).

In 1980, *Wildlife In North Carolina* published a short article about this technique, and other fishing publications have also described how it works. Even so, relatively few fishermen seem to know about it. And those who have heard of it either can't recall exactly how it works, or find it difficult to believe that it lives up to its reputation.

Because of this it seems like a good time to publicize it again. There is also—though it pains me to admit it—yet another reason.

At the time I wrote about this easy hook-removal technique in 1980, I had used it with surprising success to extract deeply embedded hooks from several people—once even from a fellow angler's Adam's apple. Still, I had to accept their word for it that the episodes had been virtually painless, and understandably I was not curious enough to intentionally plant a hook in my own hide simply for the sake of verification.

I confess, however, that my moment of truth finally arrived. Last spring while landing a 12-inch rainbow on a leader that had two flies, I made the mistake of grabbing the leader between the two flies so that I could remove the hook from the rainbow and release it. At that moment, the rainbow decided to make a final dash for it. The leader slipped through my hand, driving the second fly deep into my index finger. For several anxious moments I was yo-yoing a leaping bundle of energy until I managed to gnaw through the leader and free the fish.

Since I was alone and miles from help, I figured it was a good time to try the technique I had so extravagantly applauded. Fortunately, the hook was in a place that allowed use of both hands so that I could reach the eye of the hook with the fingers of the hooked hand and use the other hand to snatch it out. Indeed, it worked so well that I was fishing again in a matter of minutes. There was no blood and no lingering pain. In fact, I couldn't even show anyone the exact spot a day later because it had healed so completely that there wasn't even a red mark. Of course, it was a relatively small hook—a No. 12—but it wouldn't have been much worse with a hook twice that size.

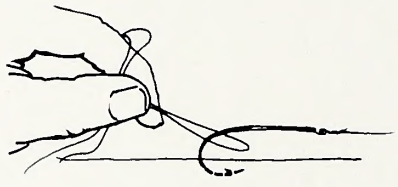
I am more than ever convinced that everyone who fishes should know how to use this technique. If you think you might forget how it works, clip out the three-step illustration and carry it in your tacklebox, fishing vest or wallet.

You need remember only a few other things. The technique works only for single hooks. If you have two or more points of a treble hook embedded past the barbs, you would be wise to see a doctor. Also, because the hook is "snatched" out, it may not work for certain tender parts of the body (such as an ear lobe). It is important to clean the wound with disinfectant, and if you suspect it might cause trouble, let a doctor have a look at it when you get home. Finally, it is always a good idea to make sure that your tetanus immunization is up-to-date. Hooks tend to be rusty and there is a risk of tetanus.

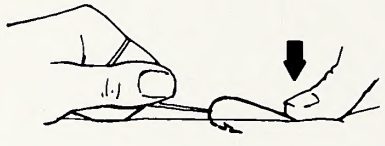
I can't say that I enjoyed collecting the research for this article, and I sincerely hope you never have to benefit from my misfortune. However, unless chain mail and suits of armor come back in style, I suspect the problem of getting hooked occasionally is something we're stuck with.

## *Easy Hook Removal*

*(Clip and keep with fishing tackle or in wallet.)*



***Loop** 20- to 30-pound test line around the bend of the hook and get a good grip. Leave leader attached to eye of hook.*



***With thumb** of your other hand, press down on the eye of the hook to elevate the rear of the hook.*

***Quickly snatch** hook out! Hook point and barb will exit without further damage to flesh.*

April, 1986
Volume 50, Number 4

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# WILDLIFE IN NORTH CAROLINA

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**Cover** *From the air, big trees in the bottomlands along the Roanoke River form a dense canopy except for occasional openings where water from seasonal flooding reflects the sunlight in this April photograph by Ken Taylor.*

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# Patriarch Of The Swamplands

*written by Lawrence S. Earley / illustrated by David Williams*

The bald cypress (*Taxodium distichum*) is a most unusual tree. It flourishes in swamps and other desolate, wet places where many other trees would die. It can grow 120 feet tall in a shifting, muddy environment even while its roots are underwater. It is a conifer and yet it drops its leaves.

Found most often in Southern bottomlands, bald cypress can also grow in other regions of the country, including New England. If the soil is loamy enough it may grow in a Piedmont backyard although it is not often seen in inland North Carolina. This is not because it is limited by climate or soil but because it is not an aggressive grower and is easily shaded out by more energetic hardwoods. A shy tree? Perhaps, although it would be more correct to say that it grows best in habitats where it won't face stiff competition. It's like other conifers in that respect. In swamps, it has found a habitat that discourages almost all competition.

How does the bald cypress stabilize itself in its fluid, mucky world? How does it get its oxygen from waterlogged soil? Good questions. For many years, botanists thought that cypress knees—those woody protuberances that grow up out of cypress roots—conveyed the tree's oxygen in times of high water. It seemed a logical conclusion for the knees grow tallest where water levels fluctuate the greatest, suggesting that their function was to reach above the surface of the water and absorb oxygen. Although experiments at Duke University in the 1950s disputed this hypothesis by showing the tree was not killed when its knees were cut off, some botanists still believe the older theory is correct.

The lateral roots of the cypress tree also play a role in absorbing oxygen and in stabilizing the tree. Lateral roots grow horizontally away from the tree and weave together with other cypress roots to form a dense interwoven mat. Even a major hurricane is often not enough to topple trees that are anchored by such a mat. And since the water in bottomlands is generally moving slightly, there is enough oxygenation at the surface for the roots to make use of.

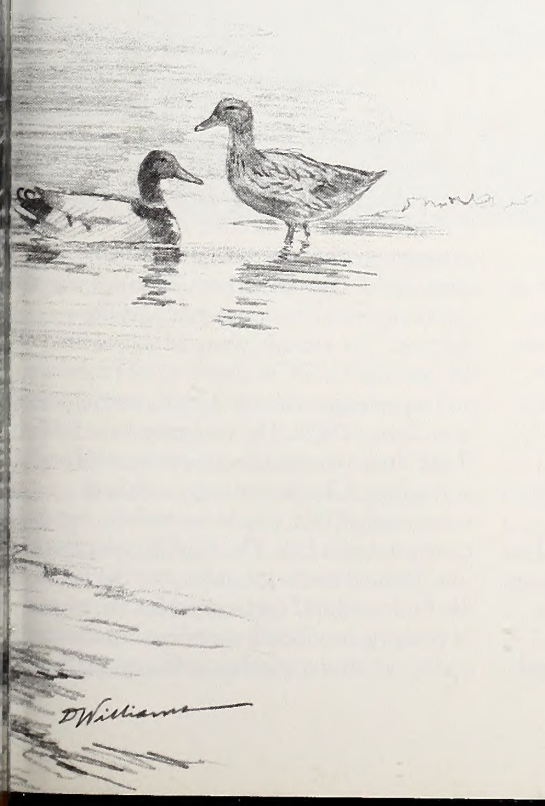
This mat of roots performs another important service, for it anchors the soil against the scouring action of floods. Without the root mat, bottomlands would be eroded severely by seasonal flooding.

The bald cypress is a conifer, although unlike other conifers it drops its branchlets of narrow and flat leaves in autumn. Its cones are about an inch in diameter. If the water is high when they fall, the seeds in the cones can survive until the water level drops and the seeds find moist soil in which to germinate. But if the swamp floods again, the seedlings are killed off, making bald cypress germination difficult.

Seventy million years ago the bald cypress's ancestors were growing throughout the steamy swamp that was North America, and fossilized remains have been found along the coast of Greenland. It is in the same family as the sequoia or redwood tree of California. It is exceptionally long-lived, many cypresses growing for hundreds of years and even longer. Recently a stand of 1,200-year-old bald cypress—the oldest stand on the East Coast—was found along the Black River.

The bald cypress is also a durable tree. It will not rot in water as will most other trees, and its wood has had many uses. Bridges have been built with cypress, and so have docks, silos and caskets. Where resistance to water is needed, cypress is the answer.

***Swamps are too wet*** *for most trees, but bald cypress and tupelo gum trees have been able to adapt to flooding and they flourish. The buttressed base of the bald cypress provides stability in this muddy world. Interwoven mats of shallow, horizontally growing roots also help stabilize the trees, enabling them to withstand even hurricane-force winds. The bald cypress "knees" that sprout from roots have mystified researchers, but many think that in times of high water oxygen can diffuse from the air to the roots through porous spaces in the knees. Though most mammals favor the ridges, swamps provide nesting habitat for many birds, from tiny warblers to long-legged herons. They are also prime wintering habitat for waterfowl.*



*MasterCard and VISA credit cards can now be used to buy lifetime hunting and fishing licenses and lifetime subscriptions to Wildlife In North Carolina.*

# Charge It FOR A LIFETIME

Ken Taylor

*by Mark Taylor*

It takes money to save money. Nobody knows that better than fishermen and hunters who haven't gotten around to scraping together the cost of a lifetime license. Or, for that matter, the cost of a lifetime subscription to *Wildlife In North Carolina*. Sure, it saves money in the long-run to buy lifetime hunting and fishing licenses or lifetime subscriptions, but you've got to come up with the initial cost first.

This problem may have been solved since VISA and MasterCard credit cards are now being accepted for purchases of lifetime licenses and lifetime subscriptions. Payments can be spread over a period of time to fit more comfortably into budgets. With a lifetime license, you'll never again have to remember to buy a license each year, and a lifetime magazine subscription doesn't need to be renewed.

Those who use VISA or MasterCard to buy these lifetime services will not only save money in the long run, they'll also be helping preserve a better future for wildlife. At current license rates, a lifetime sportsman's license will pay for itself in 10 years. And perhaps more important, revenues from the sale of lifetime licenses and lifetime subscriptions to *Wildlife In North Carolina* magazine are placed in the North Carolina Wildlife Endowment Fund. Earned interest on this money is already supporting youth programs, an environmental-education primer for teachers, and other activities and projects that will build a better future for wildlife for generations to come.

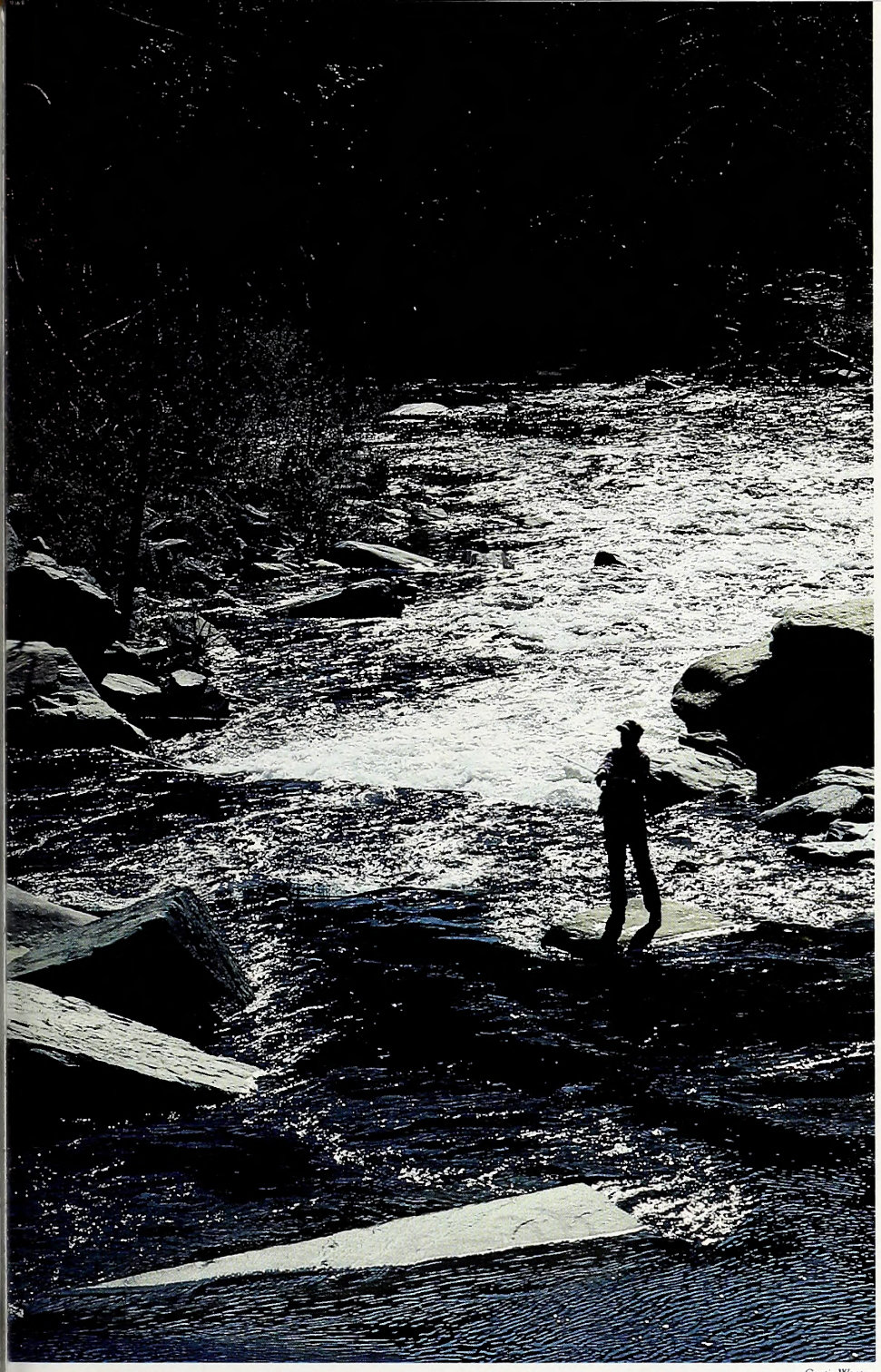
"We've had a lot of requests from the public to accept credit-card payments for lifetime licenses and lifetime magazine subscriptions, and we developed this system to allow them to be purchased with MasterCard and VISA," said Connie Spivey, chief of the Wildlife Commission's Division of Administrative Services. "This will make lifetime licenses and lifetime magazine subscriptions more affordable for many people, and we're already experiencing a lot of interest in the use of these cards. Credit-card information is currently being included on new applications for lifetime licenses. Approximately 55 license agents also sell lifetime licenses directly from their places of business, and most of these agents accept VISA and MasterCard."

The concept for the Endowment Fund was developed originally by District 5 Wildlife Commissioner Eddie Bridges of Greensboro in 1979, and the bill creating the program was enacted by the North Carolina General Assembly in 1981. This fund surpassed $5 million late last fall. For the first few years, all of the interest that was earned was plowed back into the fund and the capital grew steadily. Last year, some of the interest was used for the first time.

"In the early years, we just wanted the fund to grow," said Bridges, who currently serves as chairman of the Wildlife Commission's Wildlife Endowment Fund and Special Projects Committee. "Last year, however, we felt that some of the interest should be used for some special projects."

Approximately $90,000 in accumulated interest was appropriated from the fund to support several projects in fiscal year 1984-85. An appropriation was made to support the CATCH (Carolina Anglers Teach Children How) program, which is the Commission's new youth-fishing program. Half of the costs of establishing and supporting a youth-coordinator position, which oversees the CATCH and youth-hunting programs, were also supported by this appropriation. Money was also used to place subscriptions to *Wildlife In North Carolina* magazine in all public schools of the state, to publish an environmental-education primer called *Carolina Notebook*, and to produce exhibits and television spots encouraging wildlife conservation. Some of the funds were also used to hire a clerk for the Wildlife Commission's License Section who could devote full time to processing applications for lifetime licenses.

"The Wildlife Endowment Fund basically provided the start-up costs for the CATCH program in its first year," said Debbie Paul, chief of the Wildlife Commission's Youth Activities and Environmental Quality Section. "As a result, we were able to hold six one-day CATCH clinics across the state, and an average of about 35 kids participated at each free clinic. The youngsters attending these clinics learned about outdoor ethics and safety, fisheries management and conservation and, of course, had the opportunity to catch fish. The fishing equipment was donated to the program, but the Wildlife Endowment Fund supported the costs of printing brochures, membership cards and applications, patches, and a quarterly



Curtis Wooten

***Once you've bought** a lifetime license, you're immune from any possible license fee increases for the rest of your life, and you'll never have a perfect day ruined by the sudden realization that you've forgotten to buy a license.*

CATCH Newsletter. This newsletter is mailed to all members of CATCH, and offers information on upcoming CATCH events as well as educational information and tips on fishing. About 700 kids are enrolled in CATCH now, and we expect to have over 1,000 by this summer. We also plan to hold at least 18 Wildlife Commission-sponsored CATCH clinics across the state this summer."

In the long run, the CATCH program will teach many children a lifetime enjoyment for fishing, especially kids who might otherwise have no way to learn to fish. Also, they will learn outdoor ethics and develop a lifelong appreciation of the values of protecting the state's natural environment.

An appropriation from the Endowment Fund to the Commission's Division of Conservation Education also supported several educational programs. "First, we began sending a subscription of *Wildlife In North Carolina* magazine to approximately 2,230 school libraries across the State," said Sid Baynes, Division Chief. "These funds also support the production of the *Carolina Notebook*. This four-page, conservation-education primer focuses on a single topic and includes related classroom activities. Subscriptions are available to teachers, outdoor educators, and leaders of youth groups. We publish six issues a year which are mailed to over 7700 subscribers."

The appropriation also supported production of television spots encouraging wildlife conservation, and exhibits which are displayed at fairs, sportsman's shows, and other public events.

For the fiscal year 1985-86, all of these projects will be continued with the use of funds from the Wildlife Endowment Fund. Also, $100,000 has been earmarked for the construction of a proposed laboratory and visitor center at the Wildlife Commission's Pisgah Fish Hatchery pending approval by the State Budget Committee. This hatchery receives thousands of visitors each month.

What does the future hold for the Wildlife Endowment Fund? One of the goals of the Wildlife Endowment Fund and Special Projects Committee is to develop a priority list of projects.

"Some of the areas that we're looking at include land acquisition, youth and hunter-safety programs, and others," said Bridges. "We are surveying sportsmen who've purchased lifetime licenses and lifetime magazine subscriptions to find out how they would like these funds to be used.

"In addition, we plan to continue to promote the fund through the sale of lifetime licenses and lifetime magazine subscriptions. We're also looking at other means such as encouraging bequests to the Fund from wills. The good that this fund can accomplish for wildlife in the future is virtually unlimited."

Through VISA and MasterCard credit cards, lifetime licenses and lifetime magazine subscriptions are affordable for almost everyone, and the good that is accomplished by the Fund also benefits almost everyone. It's an unbeatable combination. More information on the Wildlife Endowment Fund and lifetime licenses and magazine subscriptions and the use of credit cards to purchase these services is available from the License Section, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.

Also, a special form for ordering lifetime licenses and lifetime subscriptions with VISA or MasterCard is available in this magazine facing the inside back cover.

# Plain Ol' Trout Fishing

You don't need a lot of fancy gear to fish most of the state's trout streams, but you'll catch more if you follow these tips.

by Joe Mickey

I was hooked on trout fishing over 18 years ago when I landed my first trout on the Rocky Broad River in Rutherford County. It was a stocked rainbow. Since then, I have gradually spent less and less time fishing general trout waters like the Rocky Broad. Though many of these waters contain both stocked and wild trout, I've spent more time on the native trout waters which contain only wild fish. It's a fairly natural progression for many fishermen, and many of us tend to forget that our first trout was a stocked fish. In fact, some anglers turn up their noses at stocked fish.

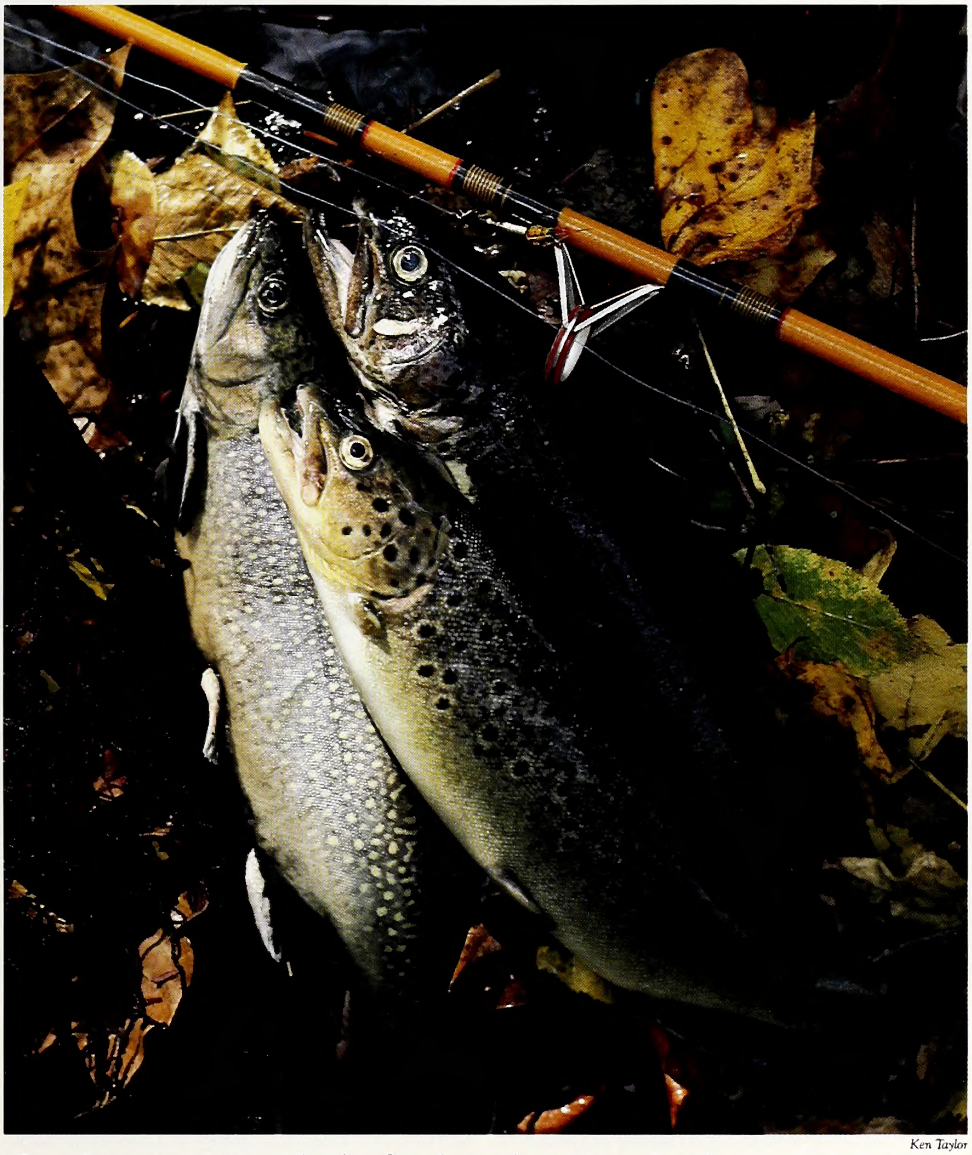
Stocked streams, however, can provide good fishing on scenic, easily accessible streams that might not be capable of supporting an adequate number of wild trout. Such streams also reduce pressure on pure, wild fisheries, and they give anglers the freedom to fish with virtually any bait or lure. Also, many of these streams contain wild and holdover trout which can furnish a good challenge even for advanced fishermen.

Contrary to what many novices think, you don't really need a great deal of equipment to fish for trout. A modest investment in gear can get you started, and the important thing is to keep your equipment light and simple.

Because of the cool water temperatures of our trout streams in the spring and fall, many fishermen use hip boots or chest waders. From late May into the fall, however, all you really need is a pair of wading shoes or old tennis shoes. Carpet pieces or felt glued to the bottom of your wading shoes or boots with waterproof glue is a must, unless you enjoy an unplanned, but refreshing dip every now and then. Sometimes I think a pair of knee pads would also be useful, especially for that "unexpected slip" on wet rocks. A trout fishing vest or old jacket with lots of pockets for storage of gear and food is a necessary item. Some anglers wear a hunting vest, using the game pouch as a creel for trout. Many anglers consider Polaroid sunglasses a must because they reduce glare and give the fisherman the added advantage of spotting a feeding trout before it spots you and heads for cover. Since most of our stocked trout and wild native fish range from 7 to 12 inches, a landing net isn't necessary. However you may want to carry a trout landing net just in case you hook one of these stocked 2- to 6-pound surplus brood trout or a large native brown trout.

While flyrods are effective for stocked trout, the most popular equipment on general trout waters is an ultra-light spinning outfit spooled with 4- or 6-pound test line. The lighter the line, the harder it is for the fish to see, and it gives lures better action. Because many of our general trout waters are small, light-action rods which can cast small lures long distances work best. A rod 5½- to 6½-feet long is a good choice.

On designated native trout waters, baits



Ken Taylor

***These three nice trout*** *were hatchery brood trout that are larger than the normal 9-inch stockers. Excess brood trout are stocked in streams every year, giving lucky anglers a chance at a bigger trout in streams that may be too marginal to grow large, wild fish.*

***Most trout fishermen*** *who fish the 1,027 miles of general trout streams in western North Carolina use spinning tackle with either lures or natural bait.*

Curtis Wooten

***The rough and tumbling*** *freestone streams of the Southern Appalachians aren't always easy to fish with spinning tackle, and it sometimes takes creeping, climbing and careful casting to get a lure or bait over a fish.*

are not allowed and lures are specified by regulation, but on general trout waters, there are no lure or bait restrictions, and most anglers fish natural baits much of the time. Popular baits include nightcrawlers, grasshoppers, small crayfish, stick bait (caddis fly larvae), "grampus bugs" (hellgrammites), small minnows and canned corn (perhaps because it may resemble trout chow). Experts who fish with canned corn differ on which "name brand" works best, but it's wise to choose a brand that has tough kernels because they remain on the hook longer. At any rate there aren't many baits you can eat for lunch if the fish don't like them.

Crayfish are effective, especially for larger stocked trout and large wild fish. Many fishermen hook the crayfish through the tail, but this may result in missed strikes. By taking a long shank hook fastened to the crayfish by a small rubber band (hook point near head of crayfish), you're less likely to miss strikes. Stickbait is also a favorite bait. It is actually a caddis fly larvae which builds protective homes underwater. Some homes are made from small twigs, leaf particles or sand and gravel cemented together to make cases. Trout recognize these structures and eat them, case, insect larva and all. Don't forget that it is illegal to collect bait from designated public mountain trout waters, so be sure to collect your bait from a stream not designated as trout water.

Grasshoppers and Japanese beetles make excellent baits, especially in June, July and August. One angler I know even collects and freezes these insects for later use during late fall and on warm days in winter. He claims they're deadly for larger trout in winter.

Spinners, such as No. 0 or No. 1 Mepps, ¼-ounce Panther Martins or Rooster Tails work well and handle most stream conditions. Favorite colors seem to be orange and black, gold, white, and white and black. Small Rapalas or Rebels colored to resemble a small rainbow or brown trout and Flatfish lures also catch trout.

Fly fishing, though more popular on native trout waters, is effective for stocked trout with favorite flies being the Royal Wulff, Adams, Irresistible, Tellico Nymph, Ted's Stonefly Nymph, plus many more.

The best time of day to fish for trout seems to be in the early morning and late evening hours; however, skilled trout fishermen often catch fish all day. Trout prefer to stay in areas where there are places nearby to hide in good protective cover. Fish for trout behind boulder strewn areas, brush and debris piles, submerged logs and undercut

banks, or any areas which break the stream current so the trout have resting spots. Trout hold in these areas of reduced flow and expend little energy while waiting for terrestrial or aquatic insects to drift past.

Normally, you want to avoid long shallow reaches, sand bottom pools and areas with little cover since few, if any, trout will be found in these areas. However, trout will lie in the open current to feed. It's best to spot these fish before they see you and spook, then cast to the feeding fish. In late summer, look for trout in cooler waters where springs flow into the creek.

When fishing for trout, fish from concealment whenever possible, especially for wild trout. Wear dark clothes, and avoid excessive splashing because trout spook easily, and once spooked by a fisherman's movements, they normally will not bite for a long time.

If you plan to fish with bait, the bait should be fished as naturally as possible. Cast upstream and allow the bait to drift with the current, slowly retrieving the line. If you note a hesitation in the drift, even though you may think you're hung on the bottom, set the hook anyway because a trout may have picked up the bait. If your fishing line falls across a current moving faster than the current carrying the bait, the line will be pulled by the faster current, dragging the bait unnaturally. Most trout will not eat a dragging bait or fly.

You can get a more natural drift if you rig the bait properly. One proven method is to use a BB-sized split shot attached to the line from 8 to 24 inches above the hook. This will allow the bait to drift freely and stay suspended slightly off the bottom.

Spinners and streamer flies seem to work best for trout when cast upstream across the current, quartering the lure back through pockets of calmer water behind boulders, brush and other protective cover. Don't overlook spots with heavy rapids because trout will inhabit white water areas while feeding. Lures also seem to be highly effective when the water is dingy after a passing thunder shower.

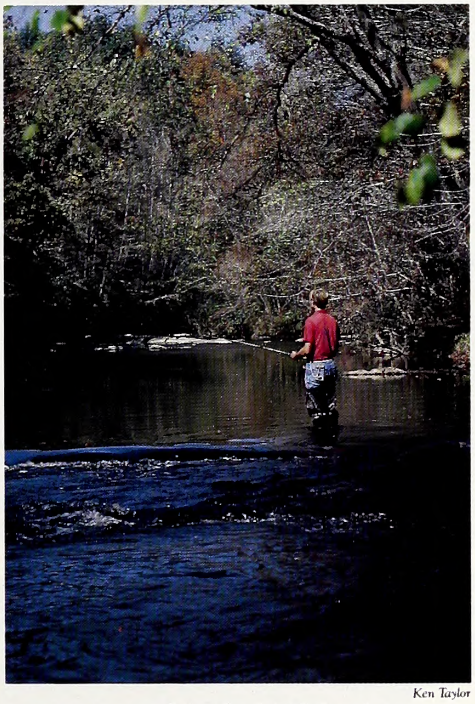
Contrary to what many fishermen believe, many trout caught with bait or spinners can be released to fight again another day. Unless hooked too deeply in the gut or in the gills, trout can be carefully handled and released. It's not always necessary to "limit out" on each trip, and the fishing experience can often be reward enough, especially if you know you've left some "wiser" trout to be caught again another day.

With 165 streams totaling 1,027 miles and 16 lakes totaling 1,117 acres located in 25 western counties (all managed as general trout waters and stocked with hatchery-reared trout), there are lots of places to fish. A complete listing of all general and native trout waters giving the county, stream name, and section open to public fishing is available from the Division of Boating and Inland Fisheries, N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, NC 27611.

If you're a beginner, it might be a good idea to try one of the intensively stocked streams. These streams are stocked once every 10 to 14 days from April through August. In the northwest mountains, the best intensively stocked streams are the east Prong Roaring River (Wilkes County), Little River (Alleghany County), Watauga River (Watauga County) and North Fork New River (Ashe County). Favorite streams farther west are the South Toe River (Yancey County), lower Wilson Creek (Caldwell County), Linville River (Burke and Avery County), Rocky Broad River (Rutherford County), and Curtis Creek (McDowell County). Favorite streams in the western-most part of the state include the Davidson River (Transylvania County), Bent Creek (Buncombe County), and Jonathan Creek (Haywood County).

Curtis Wooten

***This small wild rainbow*** *took the spinner. Despite some fishermen's beliefs, trout hooked on treble hooks are not always doomed. If released, many live to be caught again. Big pools like this one (left) are ideal for spinning tackle.*



Ken Taylor

County maps, which show state secondary roads are one of the best bets for locating streams. These maps are available from county courthouses and from the Map Section, Division of Highways, N.C. Department of Transportation, Raleigh, NC 27611. If you plan to fish game lands streams, ask for a free book of game lands maps when you purchase your licenses or ask the Division of Boating and Inland Fisheries for one when you write for a list of stocked streams.

Several licenses apply to trout fishing on state-managed waters. In general, a regular state fishing license is required for all waters (for exceptions, see the N.C. Hunting and Fishing Regulations Digest). In addition to the regular state fishing license, a special trout license is also required on waters designated as public mountain trout waters, and a special game lands use permit is required when fishing game lands waters. Children under 16 years of age are exempt from fishing license requirements.

Ken Taylor

Ken Taylor

***Fisheries biologist**, Joe Mickey (left), and his assistant, Bennett Wynne, use electro-shock equipment to temporarily stun trout in a mountain stream and assess the fish population (above). Wynne (left) and Mickey gather information on growth rates and other important factors indicating the overall health of the trout. Electro-shocking is especially useful in determining the capability of a stream to support natural reproduction, and this influences decisions concerning the need for stocking.*

# Year Of A Trout

## Hatcheries still provide a lot of trout and a lot of sport, especially in many streams where natural reproduction is poor.

by Joe Mickey

Shortly after daylight on opening day of the trout season, you stand knee deep in the icy water of a stream shivering. Nothing about the bleak scene around you would tell you that this is an annual rite of spring except there are other fishemen in the misty distance. Suddenly, a few light taps on you line tell you that you are doing business with your first customer of the new year. Moments later, you set the hook and land a 9-inch rainbow trout.

This year, before you either release that first trout or put it in your creel, consider for a moment how it got into your hands (no, you needn't stop fishing while you're thinking about this). If it's a streambred trout, it's had a pretty interesting life from the time it was hatched in the gravely bottom of the stream. And, if it's a stocked trout that was raised in a hatchery, its life has also been pretty interesting.

Fish hatcheries are an integral part of the N.C. Wildlife Resources Commission's trout-management program. The Division of Boating and Inland Fisheries operates four trout hatcheries and that rainbow you caught will have visited three of them before it was stocked in the stream. The Commission's largest hatchery, Pisgah Forest near Brevard, was previously a national hatchery owned by the U.S. Fish and Wildlife Service and transferred to the Wildlife Commission on October 1, 1983. Pisgah Forest maintains brook, brown and rainbow trout year round; however, all the rainbow trout reared for stocking come from Pisgah Forest. Armstrong Fish Hatchery, north of Marion, is a major year round brook and brown trout production facility, while the Marion Fish Hatchery, two miles north of Marion, is utilized only as an egg hatching and trout fingerling facility in the fall, winter and spring. Table Rock Fish Hatchery, north of Morganton, rears trout from Pisgah Forest and Armstrong Hatchery during the fall, winter and spring.

To get that rainbow on your hook in 1986, work began two years earlier when fisheries biologists from the mountain regions (Districts 7, 8 and 9) estimated the number of hatchery-reared fish that would be needed for stocking this spring. After they decided that it would take 617,000 catchable trout (71,000 brook, 236,250 brown, and 309,200 rainbow) to stock 165 streams totaling 1,027 miles and 16 lakes totaling 1,117 acres, hatchery personnel began preparations for taking eggs from brood fish. Thus, in August 1984, your 9-inch rainbow trout was already being planned at Pisgah Forest Hatchery.

Ken Taylor

***It isn't unusual*** *for electro-shocking equipment to turn up some surprisingly nice fish like this fat brown trout. Fishermen would be almost as stunned as the trout to learn how many big trout live in some of the water they fish.*

"Beginning in early September and continuing through November of that year, with water temperatures ranging from 56° to 40°F, hatchery rainbow brood trout began to become sexually mature and ready for spawning," explains Jerry Hodge, Pisgah Forest Hatchery superintendent. "These brood trout are 3- to 4-years old and weigh from about 3 to 4½ pounds. We strip 2,000 to 3,000 small pea-sized eggs from each female, and mix them with sperm from several male fish in a pan where they will be in close contact for several minutes. That's more than enough time to allow fertilization to take place, and only about 0.1 to three percent fail to become fertilized."

Once the eggs have been fertilized and become firm, they are put into incubator trays with a constant flow of water to maintain adequate oxygen levels for egg and fry development. Your 9-inch rainbow trout was one of over 1,100,000 trout eggs taken by Commission hatchery personnel. The egg stage lasts for 30 to 50 days depending on water temperatures. The cooler the water, the longer it takes for the eggs to develop and

Curtis Wooten

***Fisheries assistants*** *capture female brood trout which are stripped of their eggs. Milt from the males is mixed with the eggs and fertilization takes place almost immediately.*

hatch. Ideally, water temperatures should range from 54°F to 63°F.

The "eyed" egg stage is signaled by the development of heavy pigment clearly visible in the iris. This stage usually occurs 18 to 28 days after fertilization, and at this point eggs can be handled or shipped without harm. Before this, rough handling will result in heavy mortality and most egg losses occur in the pre-eyed state. Oddly enough, there is a short period of about two days immediately following fertilization when the eggs are also relatively hardy and can be shipped "green."

Your rainbow made its first trip on November 22 when it was shipped to Marion hatchery. Because the water supply at Marion is spring fed with water temperatures constantly around 57°F, it's ideal for egg development. By this time your rainbow is one of over 500,000 eggs kept under the watchful eye of Joey Stepp, fish culturist.

"Eggs at Marion normally hatch in 35 to 40 days after fertilization when they become sac fry," said Stepp. "The name sac fry comes from the large yolk sac that provides nourishment while they're in this stage; however, they can't swim well with it. It usually takes 10 to 14 days for the yolk sac to disappear."

When the yolk is nearly used up, the fry become more active, and it's at this stage that the sac fry become fingerlings (approximately ¾ inch long). At this stage, they can begin to eat trout chow which will sustain them while in the hatchery system and their "binges" require six to seven daily feedings of powder-like food for the first month. Throughout a trout's life in the hatchery system, feeding rules are adjusted to accommodate growth. Feeding is reduced to twice daily once the trout reach 3 to 4 inches. Each year, trout in the hatchery system consume over 517,000 pounds of food—that's 250 tons!

The rainbow trout you caught left the Marion Hatchery on April 22, 1985 to return to Pisgah Forest along with the rest of the rainbow trout fingerlings. At this point, it's 3 inches long, and needs less crowded conditions in outside raceways to continue to grow.

Through the summer, fall and winter, at Pisgah Forest the rainbows will have been weighed and sample-counted at least once a month to monitor growth and adjust feeding rates. Pisgah Forest hatchery personnel also keep a watchful eye for disease. If disease breaks out in a raceway containing several thousand fish, the results could be disastrous. At the first sign of a disease hatchery technicians change the trout's diet to a chow pellet which contains antibodies.

Even if the trout escape disease, they still may face one of several threats. Low water levels and elevated water temperatures in the summer, and extremely cold winters can both slow feeding and growth rates. Extremely cold periods during winter can also freeze water lines within the hatchery system and cut off water flows to the fish, creating stress and possible fish kills. Fall is also a critical time because heavy leaf litter in the stream supplying water to the hatchery could block water intakes to the raceways, and hatchery personnel keep a 24-hour watch during this period.

Curtis Wooten

***Howard Hembree** at the Armstrong Creek Hatchery near Marion measures a batch of recently fertilized trout eggs. After the eggs "water harden" or become firm, they are placed in incubator trays with a constant flow of water.*

***It takes approximately** 35 to 40 days after fertilization for trout eggs to hatch and become sac fry. The relatively large yolk sac provides nourishment for another two weeks, and the fry or tiny trout become much more active.*

Ken Taylor

***Jerry Hodges** at Pisgah Forest Hatchery weighs trout to see how well they are growing. Normally, it takes about two years from egg to stocking truck to grow to catchable size.*

Curtis Wooten

By August 21, 1985 your rainbow has reached a length of 6½ inches, and by March 1, 1986, he has reached 9 inches and is getting ready for another move. Throughout January and February hatchery personnel have been developing stocking schedules. Determining who goes where and with how many fish is quite an undertaking when you consider that 165 streams and 16 lakes designated as general trout waters must be stocked by opening day. Furthermore, stocking must be continued through May when the numbers of streams stocked begins to decrease each month until the end of the stocking season in August.

Our rainbow trout is one of the several trout to be stocked during March in Wildlife District 7 which means that it will have to be transferred from Pisgah Forest to Armstrong Hatchery since Armstrong stocks this area and does not rear rainbow trout. On March 1, 1986 our fish is transferred to Armstrong Hatchery where it is held in a raceway with thousands of other trout. During the last two weeks of March, stocking trucks will be on the road constantly taking trout to assigned streams and lakes.

The day our fish is scheduled to be stocked—March 26—is typically cold and windy. Gary Gouge and Jim Hollifield, fish culturists at Armstrong, arrive at 7:00 that morning to prepare the truck for the day's long trip. Forty-five minutes later, 2,800 trout destined for six streams are loaded onto the stocking truck, and Hollifield and Gouge begin a two-hour journey to Alleghany County where they will meet Bennett Wynne, assistant fishery biologist, and me to begin stocking the trout into their assigned streams.

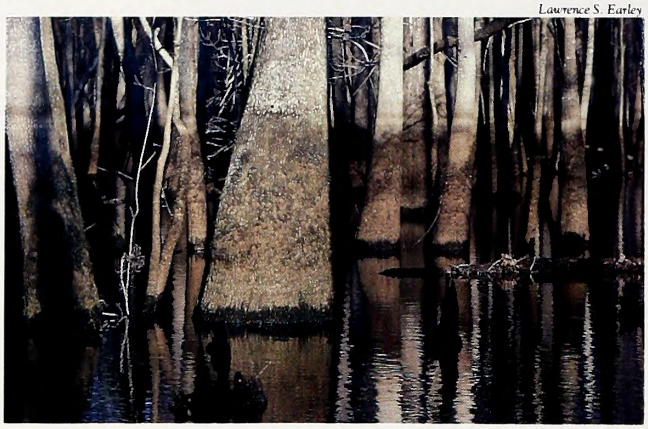
During that long day, the trout will be transferred from the truck into buckets with perhaps 25-30 trout per bucket. Instead of all the trout being dumped into one or two popular fishing holes along the stream, they are stocked a few at a time over a much wider area. This "scatter-stocking" could never be accomplished by the small staff of fisheries employees, but with the aid of enforcement officers and fishermen who volunteer to help, the trout can be dispersed better. The fishing is more natural, the trout tend to remain in the stream longer, and some even avoid being caught and live to reproduce. (Scatter-stocking was used in North Carolina for the first time in District 7 at the urging of Wildlife Commissioner Cy Brame of North Wilkesboro.)

The 9-inch rainbow trout you caught soon after daybreak on opening day was carried to the stream down a rocky embankment at 4:15 p.m. I know it was your trout because I carried it, and I can tell you that after so many trips to the water with so many buckets of trout, your trout and its brothers felt a lot bigger than 9 inches.

I scatter-stocked him with a few others at the head of a nice little riffle, and I especially watched the one you caught as it swam upstream and rested behind a rock. Nice trout. Tasty too, no doubt. And unless you've worked up a real hunger, you might consider slipping him back in the water. He'll be even bigger later on. ⊠

***A stand of tupelo** gum trees casts colorful reflections in this Roanoke River slough.*

Lawrence S. Earley



*The mature hardwood forests that have escaped the ax in the Roanoke River lowlands and in other major river floodplains are remnants of the finest wildlife habitat in the state. Saving them is critical.*

*by Lawrence S. Earley*

Monday morning is probably typical for the Idle Hour crowd. At 10 a.m. about a dozen men are gathered at a table in this Scotland Neck restaurant. Others come in and slap the sitters on their backs before buying a cup of coffee and departing. From the seated group the sounds of good-natured talk rise and fall. As in many towns and villages in Halifax County, land seems to be the chief topic of conversation. "Who owns that pretty piece over yonder by..." "How many acres?..." "You know where I killed that deer by Devil's Gut?"

Idle Hour conversation is as good an introduction as any to northeastern North Carolina and you sense it as you ramble about. This is a big country up here, historic country, former Tuscarora Indian land that today grows peanuts, soybeans and corn from the hard top to the woodline. Farm land mostly, although in plantation-sized chunks crowned by the stiff, columned mansions that carry echoes of the late, lamented Southern past. Liberty Hall, Hope Plantation, Ventosa. Some plantations derive from the original royal grants, while newer ones are still over 100 years old.

Through this broad, flat country runs the Roanoke River, twisting around on itself like a snake in death throes. The Indians reportedly called it "River of Death," and long-time residents know why. Many of the old houses in the area are set on brick pillars to protect them from the rampaging flood waters. Old-timers still talk of the flood of 1940 that left water marks on the tops of hunting cabins inland. Even today, spring floods frequently sweep the incautious to their deaths.

The Roanoke and its floods are the key to understanding the region's land, people and wildlife. A man like Lewis Rascoe could own about 2,500 acres of land running for three miles

Lawrence S. Earley

# Along

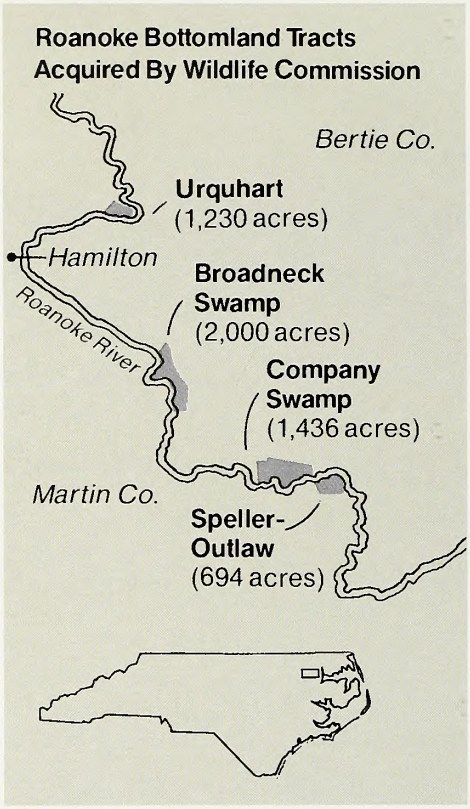
**Low-water levels** *leave bald cypress roots high and dry along Roanoke River.*

# The Roanoke Bottoms

*"These ridges and sloughs hold an ancient secret. For they are evidence that the river has moved its course, not once but several times."*

through Broadneck Swamp to the river in Bertie County and only have 360 acres of it cleared and under cultivation. Knowing about the floods helps you understand why. It helps explain the broad belt of bottomlands flanking the river, 150,000 acres in all, according to one estimate, the most extensive and intact bottomland hardwood system in North Carolina and one of the largest in the Southeast. Hunters and biologists speak with reverence of the populations of turkeys found along the river, of the deer and wintering waterfowl. There are heronries and nesting birds of all kinds. The hunting here is legendary and they do it the old-fashioned way, in exclusive hunt clubs with kangaroo courts and shirt tails lopped off and framed and hung on walls.

Another thing. The Roanoke is mostly private country, where land passes from one private landholder to another. Until recently, that is, when the Wildlife Resources Commission, working closely with the N.C. Nature Conservancy, bought four tracts of bottomland hardwoods totalling 5,360 acres (see map). The purchase was immediately described as one of the most significant acquisitions for wildlife in state history.




Last April and again in January of this year, I hiked through the Urquhart Tract and the Broadneck Swamp Tract, two of the Wildlife Commission's acquisitions, talking with landowners, foresters, hunters and biologists. In the process I gained an understanding not only of the Roanoke's importance, but of the importance and fragility of other bottomland areas throughout the state.

The Urquhart Plantation is located on the north side of the Roanoke, about three miles from Lewiston. Here the river makes two wide loops, called "necks," and the Urquhart property is enclosed by the wider of the two. Merrill Lynch was my guide on an April Sunday. An ecologist with The Nature Conservancy, Lynch, 30, has been roaming the Roanoke bottomlands since he was 15 years old. From 1977 to 1981, Lynch made boat, ground and air surveys of the Roanoke floodplain from Weldon to the Albemarle Sound for the N.C. Natural Heritage Program and the Nature Conservancy. The 20 natural areas that he identified guided the Conservancy and Wildlife Commission purchases.

We walked along the river for a while, on a high bank that Lynch called a natural levee. Hundreds of years of annual floods have dropped layers of upriver sediment onto the floodplain, the heaviest sediments falling next to the river channel forming the high levees. A levee along the Roanoke may be as high as 15 feet above the lowest portion of the floodplain, and possibly half a mile broad.

If you were to look at the floodplain we were walking through in two-dimensional profile, you'd see the levee next to the river, the highest point of land. The ground would gently slope away from the river to a back-swamp, then rise to a ridge, then slope again to a slough, rising and sloping several times to produce a corrugated topography much like a washboard.

These ridges and sloughs hold an ancient secret, for they are evidence that the river has actually moved its course, not once but several times. "It's called ridge and swale topography," Lynch said. "The river is constantly migrating through the floodplain, cutting a new channel and abandoning it. The sloughs are the abandoned river channels, and the ridges are the old levees that used to be along the river. Actually what most people call the river is the low channel of the river. The high channel is the whole floodplain."

How can the river change its course so often? The key to this phenomenon is the flat land that it flows through. The Roanoke River — like the Tar, Cape Fear and Neuse — follows rocky channels as it rushes out of the mountains and through the Piedmont, carrying fertile Piedmont soil as it goes. The banks of these brown rivers are steep. (Black water rivers like the Black, the Waccamaw, and Lumber mostly drain the Coastal Plain and are less silt-laden.) But as they enter the flat Coastal Plain they slow down and spread out in sinuous meanders. A meander is nature's most efficient way of stabilizing excess energy, as skiiers learn when they zigzag down a hill to reduce their speed. Rivers do the same thing by meandering. As these rivers rise and fall during annual wet and dry season, they flood surrounding flat land, occasionally finding new channels and abandoning old ones.

It's this periodic flooding that makes a bottomland. Although river floodplains (and bottomland hardwoods) can develop in Piedmont and even in mountain areas, wherever local topography flattens, nowhere else in the East do you find so much flat terrain as in the Coastal Plain of the southern United States. The Southeast is bottomland hardwood heaven.

Lynch pointed out the sugarberry, green ash and sycamore trees on the levee. Underneath were shrubs such as spicebush and buckeye. Bottlebrush grass grew luxuriantly in the soil. "In the hardwood forests of the Piedmont," he said, "you don't get this hundred percent ground cover, just leaf litter. This is such rich soil and when it gets flooded it's natural fertilizer." He dug at the soil with his hands. "Look at the amount of humus in that, and it holds moisture well because it's got a lot of clay in it. There's a real diverse soil fauna in this soil, lots of little invertebrates. So it starts with the river flooding, which gets us that rich soil, and then the plant communities and animal communities that build up in that soil. Everything spells r-i-c-h."

Besides serving as habitat and food for fish and wildlife, forested bottomlands provide important services for the entire river and estuary system. They hold the soil in place during floods, reducing erosion. They also slow the rate of river flow and help maintain the delicate balance of salinity that determines the productivity of the estuaries. Floodwaters lift detritus — fallen leaves and

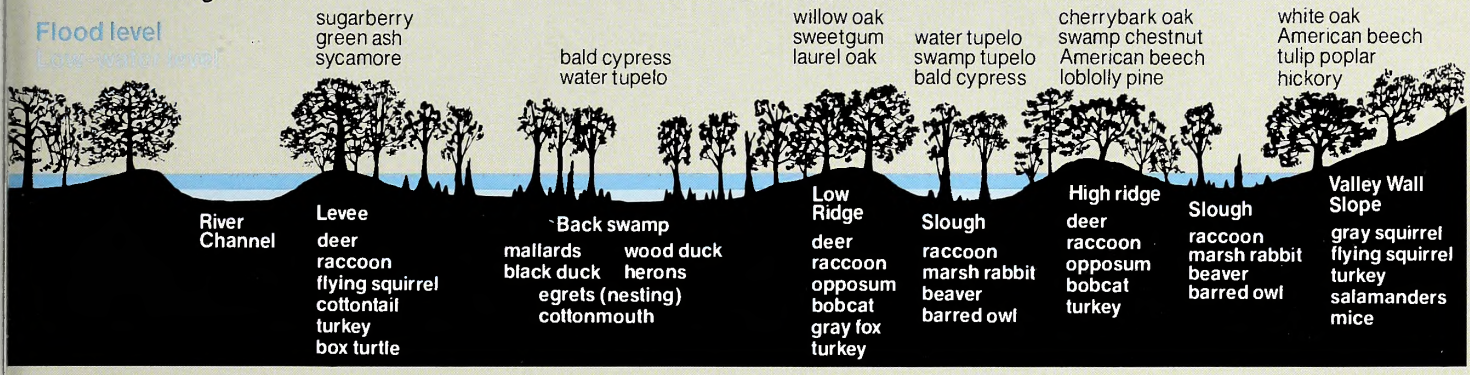
# Anatomy Of A Bottomland — The Roanoke, Wet And Dry

Frederick Annand

high water

Lawrence S. Earley

low water




***Half of a typical** Roanoke River floodplain is shown in cross section in flood and low-water stages. The floodplain consists of low and high areas that vary in wetness. Formerly, the natural levee, the backswamp behind it and the sloughs were flooded seasonally, while the ridges were inundated only during 50- or 100-year floods. Today, dams upriver interfere with traditional flooding patterns. The frequency and duration of the flooding in a particular place influence the kinds of vegetation and wildlife that can live there. Backswamps and sloughs support winter populations of waterfowl and nesting herons and warblers, while the mast-producing trees on the levee and ridges feed and shelter most wildlife. Illustration shows dominant tree and wildlife species along the floodplain.*

bits of animal tissue — from the forest floor and ferry it downriver to the estuary where it becomes an essential part of the aquatic food chain. Bottomland swamps also improve water quality by filtering out harmful herbicides and other pollutants.

We walked away from the river, off the levee, and the ground gradually sloped down into a broad swamp. In a wet season this backswamp would be swimming in water 5 feet high on the tree trunks, a water regime that only tupelo and bald cypress trees have been able to adapt to. But on this April day the huge tupelo gums stood high and dry in an open, almost parklike landscape. The ridges beyond contained the true bottomland hardwoods. On the lower ridges there were a variety of bottomland oaks, including giant willow oak, laurel oak and swamp chestnut oak, beech, sweetgum, a couple of hickory species, and an occasional loblolly pine. The Commission tracts have been selectively timbered over the years mostly for green ash, leaving quantities of old-growth hardwood stands, one of the most attractive features of these lands.

The diversity of habitats from wet to dry in the Roanoke bottomlands — and in bottomlands in general — means there is food, cover and shelter at different times of the year for many animals. On the higher ground, a teeming mammalian life devours the fruits, berries, nuts and acorns and browses on greenbrier and cane. This is also where turkeys are found in the greatest numbers. The wetter areas provide food and shelter for wintering puddle ducks as well as nesting habitat for herons, egrets, red-shouldered hawks, the Mississippi kite and several unusual birds like the cerulean warbler, which finds a home here even though it is a mountain species. The insect-eating kite is at its northern limits in the Urquhart Plantation. The wetter areas also support a great diversity of fish species that feed on the abundant aquatic invertebrates.

While standing in the tupelo stand that afternoon, Lynch called in a red-shouldered hawk we had seen above the canopy. He produced a series of loud squawks by blowing through a piece of grass stretched between his thumbs. The curious bird glided through the trees and settled on a branch overhead. During fall migration, Lynch has seen as many as 550 hawks in a single day along the Roanoke bottoms.

Because bottomlands are so rich and productive, they have rarely been left alone. Hunters and bird-watchers are not the only ones who want to use them. In the Coastal Plain, farmers and timber companies have craved the rich soils for their growing potential. But the black gold of bottomlands have posed some of the sternest challenges to human intervention. Several hundred acres of land timbered for farmland may well lie eyeball deep under water in a spring flood. Along the Roanoke, you can still see dikes that slaves built to hold back the flood waters.

Timbering operations have rarely threatened the Roanoke bottomlands because the bottomland itself is normally left intact to grow new trees. In the past 20 years, however, intensive forestry practices in bottomlands have posed a more worrisome problem. Some timber companies have established plantations of young hardwood and even pine trees in bottomlands. These monocultures are planted, cultivated like a row crop, and harvested quickly.

This January, I saw a 1,200-acre Union Camp clearcut adjacent to the Wildlife Commission's Broadneck swamp tract in Bertie County. The land was planted in rows of different-aged sycamores, sweet gums

*"The diversity of bottomland habitats from wet to dry means there is food, cover and shelter throughout the year for many animals."*

Lawrence S. Earley

***Old-growth hardwood trees** give the ridges a stately, parklike effect.*

and ash, none of them as tall as a man.

Union Camp spokesman Joe Stutts says that the intensive cultivation techniques were developed through the Hardwood Research Cooperative of North Carolina State University, and are intended "to control, not eliminate, competing vegetation during the early growth years of the trees." The trees are destined to produce pulpwood suitable for the production of high-quality books and other publications. The first plantations were established in 1974, and none of the trees have been harvested yet.

From a wildlife perspective, the clearcut itself is excessive. Wildlife biologists like to see smaller cuts, irregularly shaped to produce the maximum amount of edge, and with denning trees and snags left for cavity nesters. Rod McClanahan, the Wildlife Commission's district biologist in the northeast, says that in general monoculture plantations don't have the value for wildlife that naturally regenerated areas have, although during the early stages grass growing between the rows provides food for some species. "We're seeing a lot of usage of those sycamore plantations by turkey broods," he said. "They're turning out to be fabulous strutting areas for gobblers." Deer and small game will eat the grass and sedges, too.

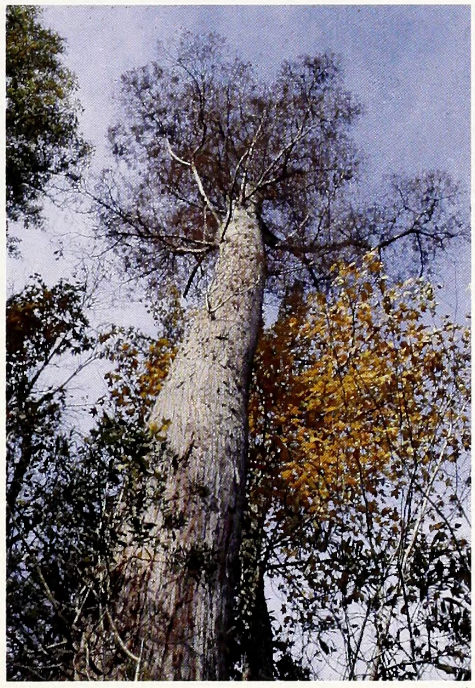
But once the trees grow about 10 or 15 feet high, the canopy closes and reduces the grasses. Compared to the original habitat, these stages may be called wildlife deserts. There were green ash, sugarberry, American elm and some cherrybark and willow oaks, as well as sycamores, sweet gums and green ash. Turkeys used it then, and so did squirrels and raccoons, and wood ducks used it for the mast. It was also good habitat for the neo-tropical birds—prothonotary warblers, parula warblers, Swainson's warblers and others. Habitat that supported a broad diversity of wildlife was eliminated in favor of habitat that at best supports a few species.

Dr. R. Wilson Laney, a biologist in the Raleigh field office of the U.S. Fish and Wildlife Service, points to another problem with bottomland hardwood monoculture. "Our contention is that work in those areas should require a Section 404 permit from

***The Roanoke River's** bottomland hardwood forest is the most extensive in the state. In spring, mixed hardwoods show a leafy green while cypress and tupelo still exhibit a wintry look.*

***The oak forests** on the ridges provide food and shelter for many wildlife species, including this gray fox.*

Steve Maslowski



Merrill Lynch

***Bald cypress trees** grow in the lowest, wettest places in the floodplain, sometimes towering 120 feet in the air. Bald cypress and tupelo gum are the only trees that can tolerate standing water.*

Leonard Lee Rue, III

***Bottomland hardwood forests*** *have become vulnerable to logging, agriculture and urban development. Flood-control impoundments, such as this U.S. Soil Conservation Service project on Crabtree Creek in Wake County (above), destroy bottomlands and cut the forest corridor, important to wildlife, into smaller pieces.*

Lawrence S. Earley

***The red-shouldered hawk*** *clings to disappearing bottomlands. Many species that depend on the deep, wet, river forests suffer when their habitat is destroyed or altered.*

*" 'When you build flood-control dams to eliminate flooding downstream, you're not addressing the problem. The problem is floodplain development.' "*

the U.S. Army Corps of Engineers," he says. Section 404 of the Clean Water Act requires permits for anyone wishing to dredge and fill a wetland. "Before these plantations are converted, the root mat and topsoil are pushed into windrows. We believe this constitutes deposition of fill in wetlands. You're having a direct impact on the hydrology of the system. We have asked the Corps of Engineers to take a look at that situation." The Corps regulates wetland development.

Other practices are far more destructive to bottomlands, however, because they either convert them into something else or alter them. Over the years, substantial bottomlands in North Carolina have been converted to agriculture, to mines, highways and, especially in the Piedmont, to urban development. Converting bottomlands to farmland is more of a serious problem in other Southern states than here. Along the Mississippi River, for example, soybean fields have replaced about 60 percent of the original acreage of bottomland hardwoods, much of it in the last decade.

In North Carolina, development seems to be a persisting threat to bottomlands. "For some reason, bottomlands seem to attract shopping centers," says Laney. Businesses, houses and apartments and other forms of urban development scrape the vegetation off the floodplain and increase the rate of runoff into the river or stream. This increases the severity of flooding downstream, creating demand for flood-control impoundments and channelization projects. "When you build a whole bunch of flood-control dams to retain runoff to eliminate flooding downstream, you're not addressing the problem," Laney says. "The problem is floodplain development. If people didn't put property in the floodplain it wouldn't get damaged."

Raleigh's Crabtree Creek and its tributaries will soon be saddled with its eleventh flood-control structure, if current plans hold true. Some are small — golf course water traps, for example — while others are larger, like the 585-acre Soil Conservation Corps impoundment on Crabtree and Stirrup Iron creeks near Morrisville. "By the time you add all these things up you've got a pretty significant cumulative loss of bottomland habitat on a watershed basis," Laney says. "These bottomlands serve as primary transportation corridors for a lot of wildlife in Piedmont areas." Floodplain developments and impoundments cut the corridor into small and disconnected units. They also increase water temperature by removing the canopy, increase sedimentation which may smother bottom-nesting species, and reduce the organic debris which is an important part of the aquatic food chain. "So the impacts are felt all the way from the headwaters probably to the estuaries," says Laney.

Besides causing direct loss of bottomlands, reservoirs and impoundments may have more insidious secondary effects. That's the concern of Dr. Russ Lea, assistant professor of forest resources at N.C. State University. The presence on the Roanoke River of three dams — Kerr Reservoir, Lake Gaston, and Roanoke Rapids Lake — has reduced the highs of the natural flooding that once existed. But where floodwaters once inundated the bottomlands and then were quickly gone, today's floodwaters may not reach as high on the trees but they linger for months. Lea is worried that this alteration of the flooding regime may well be subtly affecting the bottomlands and their diversity of flora and fauna.

One possibility being investigated is that periodic releases from dams are interfering with hardwood regeneration. "In spring time there's a normal drydown," Lea says, describing some research that has been done in Georgia. "The sun gets through to the ground, the seeds heat up and they sprout. All of a sudden, the Corps of Engineers releases a pulse from a dam upstream. It floods the sprouts and they die." The process is repeated with the result that fewer hardwoods sprout and with less vigor. "We don't have the data yet to confirm these results on the Roanoke," says Lea. "All we know is that some areas on the Roanoke haven't regenerated as well as they have in the past."

By controlling the normal rise and fall of the river, the dams may also be changing the species composition of bottomlands and affecting the bottomlands in other subtle ways. "You may change the species composition because the site is wetter than it should be," says Lea. "Even though it's not underwater, the water table is higher." Some sites may be drier for longer periods, encouraging the growth of a tree species that will be killed by an upstream release. "The hydroperiod" — the length of time the land is flooded — "may vary so much from year to year that the system doesn't know how to respond. The whole system winds up under stress. The Roanoke systems are probably under stress."

Reservoirs also make it easier to convert bottomlands to agriculture and urban development. "I'm an extremist," says Lea. "I'm not a farmer. I don't own any property along bottomlands that I want to put into houses. I don't see anything good coming out of an upstream impoundment. It's taking a resource that I'd like to manage."

Laney and Lea agree that the Corps of Engineers, as the regulators of wetland development, and the Environmental Protection Agency must be more active on behalf of bottomland hardwoods in order to stem their losses in North Carolina. They have to establish a value for bottomlands. The two scientists cite the example of salt marshes, where widespread alarm in the 1960s over their destruction created a groundswell of public opinion favorable to protection. "If we can get the concept across that bottomland hardwoods are equally good," says Lea, "and raise the awareness of the public, then it will be up to the agencies to decide where to set a development limit."

Laney and Lea criticize the existing wetland-protection programs as a permit system for the destruction of wetlands. Most of these permits are looked at individually, not in terms of their cumulative impacts. "If you're only looking at one impact," says Lea, "you'll always give the permit. If you look at the cumulative impact, eventually you'll get to the point where you say, 'No way! We can't stand one more loss of bottomland hardwoods.' "

Laney favors either comprehensive federal wetland legislation or a state statute that would protect freshwater wetlands just as the Coastal Area Management Act protects coastal wetlands.

The threats to bottomlands throughout the state makes the Wildlife Commission's recent acquisitions along the Roanoke all the more precious. "These bottomlands are some of the most valuable in the Southeast," says Hal Atkinson, chief of the Commission's Division of Wildlife Management. "We're just happy we could buy some tracts so that they can be retained in their natural state. We think our Roanoke bottomlands will preserve some of the unique natural values that the river has represented." ⊠

# Good Tidings For Turkeys

Restoration of the magnificent wild turkey in North Carolina appears to have passed a critical threshold after years of hard work and careful management, but there's still potential for growth.

Leonard Lee Rue, III

***Wild turkeys** like this quartet of jakes are strutting in areas where they've rarely been seen.*

by Brian Hyder

The old man squinted as he tried to pick out the wild turkey gobbler that he had heard just moments before. He just couldn't seem to remove the clouds that the 75 years had left in his eyes. Holding the worn box call carefully, he delivered three more perfectly arranged notes that provoked a gobble from the tom about 10 degrees off his left shoulder. Motionless, he scanned the area until he saw the old monarch approaching, slowly and cautiously probing the woods with its acute vision in quest of the hen it had just heard. The gobbler stepped behind a big white oak and the single shot scattergun once again found its place against the old man's shoulder. A shot rang out as the gobbler stepped from behind the tree. The ancient ritual of wild turkey hunting had once again been repeated.

As the old man packed the gobbler out of the woods he reflected on the many other turkey hunts he had enjoyed in his lifetime and the tales his father had told of gobblers he had taken with the same gun. It seemed turkeys had always inhabited this particular area of North Carolina but that hasn't actually been the case.

Indeed, the eastern wild turkey (*Meleagris gallopavo silvestris*), a native of North America, has seen some hard times in our state. Early settlers, explorers and naturalists such as John Lawson and William Bartram reported on its abundance here. The wild turkey was an important food item for the Indians and white men in those early days.

Near the turn of this century, however, things began to go bad for the wild turkey. Year-round market hunting and loss of habitat reduced turkey numbers and began a decline that continued until the middle of the century. Some early records reflect the turkey's history. Although early population estimates are not available, during the 1927-28 season, 6,110 turkeys were reportedly harvested. A long fall either-sex season occurred then. From 1946 to 1949, a statewide inventory of wildlife resources yielded a population estimate of 8,340 wild turkeys. In 1964 the population was estimated at about 4,000.

As turkey numbers declined, laws and regulations affecting them became more restrictive. Six turkeys of either sex were allowed during a day's hunt in the '20s and '30s, but by the '60s only five males were permitted during the entire fall season. A spring gobbler season was initiated in 1969 with a two-bird bag limit. The fall season ended in 1971. North Carolina, unlike many other southeastern states, has traditionally been a fall turkey hunting state. Spring gobbler hunting is a relatively new sport for most Tar Heel hunters.

Early efforts in managing wild turkeys included a game farm on the Sandhills Management Area. Game farms were operated by many states because they were believed to be effective management. They weren't. The Sandhills facility was operated from 1928 to 1946 and produced over 9,000 turkeys, averaging about 500 per year. These birds were released in areas all over the state, but in every case the birds failed to establish self-sustaining populations. In fact more harm was done since native populations disappeared whenever the pen-reared birds were released in an area.

Live-trapping turkeys from native populations and transplanting them to restoration sites began in the 1950s. This

technique is still recognized today as the only viable method of restoring wild turkey populations. Restoration activities during the '50s and '60s were sporadic, with some successes and many failures. In 1970 Wayne Bailey, retired turkey biologist from West Virginia, came to work for North Carolina and was successful in implementing several important programs. The Wildlife Resources Commission ended the fall season and initiated spring gobbler hunting. It revitalized the restoration program, instituted mandatory reporting of kills and outlawed the release of pen-reared turkeys. The turkey's decline began to slow down during the '70s and during the 10 years that Bailey was in charge of the turkey project the population increased from 5,000 to 8,000 birds.

Upon Bailey's retirement in 1980, I assumed the leadership of the wild turkey program. Trapping turkeys from wild populations and relocating them continues to be the cornerstone of the turkey progrm and is clearly the reason for the turkey's comeback in many areas. Since 1970 over 800 birds have been trapped and transported to restoration sites across the state. This has meant many hours and hard work for the biologists and technicians of the Wildlife Commission's Division of Wildlife Management, most of it during the cold months of January to March. Rocket nets and tranquilizing drug-treated bait are used in making the captures. Although the work is sometimes frustrating, it is also rewarding to see wild turkeys restored to their former ranges.

A lot of fond memories are gathered inside a turkey blind. Several years ago I worked with Ed Waldroop, a former wildlife technician in the mountains who is now retired. We trapped two very large gobblers one morning and upon inspecting them Ed commented, "My gosh, boys, I believe before we take those two to the release site we ought to hitch them to the plow and turn the garden." One of the gobblers weighed 23 pounds. On another memorable morning, the pre-dawn temperature was hovering near zero as we were setting up our equipment. We were using a dome tent with fiberglass poles that popped up and locked in place when you pushed down the top. We had everything in place except for the blind and when we pushed down on it the brittle fiberglass poles snapped like dry twigs. We cut pieces from our firing wire and tied the sides of the tent to some surrounding trees to give us enough room to get inside the blind. Within moments after we got inside the tent we fired the net on several turkeys and made a successful catch. When daylight came we couldn't help but laugh at our makeshift tent. Someone suggested we take it down quickly before a bunch of hobos moved in.

Normally we try to release a minimum of 15 birds at each site, with five gobblers and 10 hens usually enough to start a new population. Young poults are endangered by cold spring rains, but with plenty of protection and encouragement, a huntable population can be achieved in three to four years. Since 1970, releases have been made in the following counties with more planned for the future: Anson, Ashe, Avery, Bertie, Bladen, Buncombe, Burke, Caldwell, Cherokee, Chowan, Clay, Craven, Graham, Haywood, Henderson, Hertford, Hyde, Jackson, Macon, Madison, McDowell, Mitchell, Montgomery, Pender, Polk, Randolph, Richmond, Rockingham, Rutherford, Scotland, Surry, Transylvania, Wilkes, and Yancey.

We trapped two large gobblers one morning and after inspecting them Ed commented, "My gosh, boys, before we take those two to the release site I believe we ought to hitch them to the plow and turn the garden."

Restoration areas are selected on the basis of habitat quality with emphasis placed on the size of the proposed site, the protection offered the birds and the overall characteristics of the habitat including hardwood composition and the amount of brood range available. At present, 5,000 acres is the minimum size for an area to be considered.

Protection is critical to turkeys. The gun had about as much responsibility for the decline of wild turkey flocks as the saw. In looking over North Carolina it is evident that the best populations are protected by the landowners or by the mere size of the habitat. The densest populations are found on the Camp Lejeune Marine Corps Base which has an outstanding wild turkey management program, the Roanoke River basin, several counties in the northern Piedmont section of the state, the northwestern mountains and the national forest lands of the far west.

Because of the restoration program, increased protection, a more cooperative public and habitat improvement, the turkey's future is brighter than ever in North Carolina. Evidence of its improving status can be seen in climbing harvest rates and in counts of county populations.

Last year a detailed assessment was made of the turkey populations in each county that had turkeys. It was found that 77 counties in the state had turkeys, with the state population now estimated at over 14,000, nearly triple the 1970 figure. The turkey's comeback is also evidenced by the harvest rates which are monitored closely. In 1974 less than 100 turkeys were reported by our state's hunters. During the 1985 season, over 500 birds were reported. This was a new record for the spring gobbler season. The wild turkey gobbler, being a polygamous creature, can be hunted in the spring without harming the population. Many hens have already mated when the season begins and the gobbler's function has been performed for that year. Another important feature that last year's survey indicated was the potential range that still exists within our state, over 3,500 square miles of habitat that can support wild turkeys. This is our challenge for the future.

As turkey numbers have increased so has the number of turkey hunters. I'm sure that the first Indian that called up a tom got just as excited as every modern-day turkey hunter. Turkey hunting today is big business with clothing and call manufacturers making a good living from folks who like to chase ol' tom. It's an exciting and challenging sport. Wild turkeys are not supposed to be very intelligent, but they are highly alert and extremely wary.

A couple of years ago I was hunting a gobbler in the mountains of western North Carolina. The bird seemed to be responding well and was coming in slowly. After several minutes I realized he had gone around me, out of sight and gun range, and had placed himself on the ridge above me. Motionless and totally camouflaged, I watched him straining to see if I was a real hen. Upon satisfying himself that I was not, he simply left the area. Well, that may not necessarily be proof of the bird's intelligence, but in my opinion its pretty darn sharp.

In the decades between 1920 and 1940 it was believed that the wild turkey was doomed to extinction. Today because of the efforts of many, the species is back again in good numbers. Groups like the N.C. Chapter of the National Wild Turkey Federation have generously supported the restoration program over the years and now assist financially with turkey research and management programs.

The people of this state ultimately control the destiny of the wild turkey. People can insist that valuable habitat be protected; people can eliminate illegal hunting; and people can control free-ranging dogs and cats that plague wildlife in many areas. Working together, the people, the Wildlife Resources Commission and other conservation organizations can ensure a bright future for the wild turkey in our state. ⊠

# EATING OFF THE LAND

It can't be true that "You are what you eat." Otherwise a bunch of folks who are eating some wild stuff would be pretty weird.

by Jane Rohling

Jane Rohling

***Wild food gourmand*** *cleans mess of reindeer moss. Although many wild foods are strange, they are often richer in nutrition than garden vegetables, and foraging for them is fun.*

Oh no, there it goes again!" The sticky magenta liquid was rapidly bubbling its way over the lip of the pot, racing across the top of the stove and oozing its way towards the floor. Lea Ruggeiri and I were in hot pursuit of the escaping goo. "Quick, turn down the heat! Stir it! More sugar... more Sure-Jell!"

It was our first attempt at making jelly, and we were experimenting with elderberry and sumac juice, which, according to Euell Gibbons, was "easy to make." Several boxes of Sure-Jell and pounds of sugar later, with our feet sticking to a tacky kitchen floor, we finally gave up on our jelly and decided the mess would make great pancake syrup.

Wild foods lesson number one was learned the hard way: "Know what you're doing!" For most people, learning to identify useful plants is probably the hardest part. For someone like me, with a fair amount of education in botany and none in cooking, food preparation is more difficult. Both are equally important when you're dealing with wild foods. Fortunately, for those who want to learn, there's help available. A number of excellent wild foods programs are offered around the state, giving you the opportunity to learn the art of foraging with experts in the field.

Last year, I was invited to attend the 10th annual North Carolina Wild Foods Weekend in Reidsville, where I met Ken Perkins and his wife, Margo, who co-chair the event's planning committee. Each April, they host 100 to 150 people at Betsy-Jeff Penn 4-H Camp for a weekend of foraging and feasting. Participants come from as far away as West Virginia and Florida, and many of them return year after year to learn more about this fascinating hobby.

There has been, in the last decade or two, a great surge of interest in wild foods. Like most of the folks who come to Reidsville,

many people simply enjoy foraging as one of the many ways to spend time outdoors. For others, the attraction to wild foods is undoubtedly economic. After all, who can resist something for nothing? For still others, the lure may be the unrivaled flavor and excellent nutritional values of fresh foods.

"Comparing the nutritive value of the plants we grow with wild greens, we find that many of the wild ones are much higher in vitamins and minerals," according to Maxine Claar, Science Supervisor for the Alamance County Schools and an avid forager. The young shoots of poke plants, for example, contain three times the vitamin C of oranges. And lamb's-quarters—a weed found in practically every yard in the state—has three times the calcium and 50 percent more vitamin C and A than spinach.

Claar believes that students can benefit in many ways from a knowledge of wild foods, and she encourages teachers to use foraging as an interdisciplinary learning experience. "Social studies classes may forage and prepare a 'wild meal' similar to those eaten by the early colonists and Indians. (Jerusalem artichokes—a type of sunflower—were on the first Thanksgiving Day menu!) Students in home economics may compare nutritional values of wild and commercially grown plants, and may create and prepare delicious recipes. Environmental studies classes can emphasize finding and preparing the wild plants for survival, while stressing the rules of safe gathering.

"In my biology classes, we incorporate these ideas. Since eating is vital to life, and plant study is part of our curriculum, this unit is a favorite with my students!" says Claar. Judging by the number of teachers who attend the Reidsville Wild Foods Weekend each year, for which some receive continuing education credits, many of them agree with Claar's educational philosophy.

Your knowledge of wild foods also could help you live off the land if necessary. Many people become lost or stranded in the outdoors each year, and too many of them starve in the midst of plenty simply because they aren't familiar with the wild foods around them. James Adair, who traded with many of the southeastern Indian tribes in the 18th century, wrote, "If an Indian were driven out into the extensive woods, with only a knife and tomahawk... it is not to be doubted but he would fatten, even where a wolf would starve." They knew what foods were available and how to use them. Edible lichens, like rock tripe and reindeer moss, can provide sustenance for a short time even on a "barren," rocky island.

For those who are interested in learning about coastal wild foods, several excellent programs are offered every year at the three marine resources centers and the N.C. Maritime Museum. The programs vary in length from a few hours (for those who simply want to sample strange seafoods) to an entire weekend or longer (for those who want to go foraging among the marshes, dunes and beaches and then prepare their own wild foods feast).

"At Manteo's Marine Resources Center, some participants go out in canoes to areas in the sound where there are oysters. Some go on walking tours collecting plants. Some go out seining in the surf. And some actually go out on a commercial ship and do some fishing," said Claar.

"Squid is very good, as are eel and conch," Claar assured me. "And shark meat is delicious." Nutritionists say shark, like all fish, is high in protein, iron and niacin, and low in calories, fat and carbohydrates. Yet, in spite of these excellent qualities, many people are hesitant to try it—and many other unfamiliar foods—largely due to irrational fears and cultural predjucies.

"One of the most memorable stories from the Reidsville program was the year that Edelyn Wood said that we eat everything but earthworms," Perkins recalled with a grin. "The next year, she was presented with an earthworm cake!" (I had the opportunity

## Getting Into Wild Foods

The best—and safest—way to learn more about wild foods, is to spend time in the field collecting them, and then some time preparing them. Many nature centers and museums around the state offer wild foods programs—some on an annual basis, others from time to time throughout the year. Here are some places you might want to contact for more information about their programs:

N.C. Marine Resources Centers
- Roanoke Island Center, Manteo, NC 27954, (919) 473-3493 (Terri Kirby).
  "October Marsh and Sea Fest," Oct. 3-5. Limited to 100 people, advance registration, $15 per person, $25 couple.
- Fort Fisher Center, Kure Beach, NC 28449. (919) 458-8257 (Bill Martin).
  "Spring Wild Foods Day," April 19, beginning at 1 p.m.
  "Fall Wild Foods Day." No date set as of this printing.
- Bogue Banks Center, Atlantic Beach, NC 28512. (919) 247-4003 (Terri Pollock).
  "Savor the Sea." Series of programs offered every Tuesday from June 17 through August 12 at 3 p.m.
  "Edible Wild Plants Of the Coast." May 24 and 25, at 3 p.m. (Also offered periodically through the year.)
  "Sea Harvest Sampler." Seafood tasting, fishing. Date not set.

N.C. Maritime Museum, 315 Front St., Beaufort, NC 28516, (919) 728-7317.
"Strange Seafood Tasting," August 21, 1986. Tickets available starting May 1, $5 each, limited to 1,000.

N.C. Wild Foods Weekend, Betsy-Jeff Penn 4-H Camp, Reidsville, NC.
April 11-13, 1986. For registration or more information, Dr. Ken Perkins, P.O. Box 396, Elon College, NC 27244

The following places occasionally offer wild foods programs, but did not have dates available at this time. You can contact them for further information.

Durant Nature Park, Raleigh Parks and Recreation, P.O. Box 590, Raleigh, NC 27602. (919) 755-6640.
N.C. State Museum of Natural History, Bicentennial Plaza, Raleigh, NC 27611. (919) 733-7450.
High Point Environmental Education Center, Rt. 1, Box 401, High Point, NC 27260. (919) 454-4214.
Catawba Science Center, Arts Center of Catawba Valley, 432 3rd Ave., N.E., Hickory, NC 28603. (704) 322-8165.
Western North Carolina Nature Center, 75 Gashes Creek Road, Asheville, NC 28805. (704) 298-5600.

Maxine Claar

***Students return** from the field with wild carrots and Queen Anne's lace. Foraging for wild foods is educational and fun, and teachers are employing it for biology and even history courses.*

Maxine Claar

***Good references** are important to help the neophyte learn what wild plants can be eaten. One plant may have edible and poisonous parts, so it's best to be sure.*

to try some earthworm cake last year, and it tasted just like any other cake — the earthworms were well hidden. However, a few years ago, I tried a little earthworm quiche that was served at a program on edible insects at the N.C. Natural History Museum in Raleigh, and, I have to admit, my prejudices kept me from enjoying it. I couldn't taste the earthworms — but I could *see* them.)

"It's always most intriguing to people when we have a variety of different kinds of animal foods. We almost always have things like beaver and groundhog. We've had bear, moose, skink, muskrat, opossum and rattlesnake," Perkins said.

You don't have to be a biologist to learn to identify edible plants. You simply have to learn to look at a plant and make note of such basic features as its shape, texture, color, the arrangement of its leaves, its height, and its habitat. There are, of course, poisonous plants out there, so it's important to become familiar with them, too — especially those that might be confused with similar-looking edible species. Many field guides, such as the Peterson *Field Guide to Edible Wild Plants*,

include these for comparison.

Unfortunately, there are no hard and fast rules for testing plants for edibility. Evidence that a plant is eaten by animals doesn't necessarily mean it's safe for human consumption. A single plant may also contain both edible and poisonous parts, and a part that is edible during one season may not be at another. For example, the leaves and unripe fruits of ground cherries are poisonous, but when the fruits ripen in late summer or fall, they are edible. Preparation of a plant can also affect its toxicity. Some plants are edible when cooked but poisonous raw. And, unless you're with an expert, leave mushrooms alone! Identification of fungi is often extremely difficult, and mistakes can be deadly. Fortunately, many poisonous plants have a bitter, unpleasant taste. People who accidently put them into their mouths usually don't waste time spitting them out.

Don't try to learn too much too fast—just concentrate on a few species at a time. The advantage of attending a wild foods program is that you can learn safely in the field with experienced people.

"All of us have grown a lot in knowledge and confidence in ourselves to forage for the right plants at the right time of the year," Claar told me. "Each year I have noted that at the Saturday night banquet we have many, many more tables with a lot of beautiful foods that really taste good."

Once you've found a particular plant, there are lots of ways to remember where you saw it and when. Some foragers keep a journal or calendar recording their discoveries. You may even want to map out some of your favorite foraging locations so you can return to them. While poking around in the Uwharrie mountains with some friends one spring, I stumbled across a patch of morel mushrooms. They were growing near the bases of two gnarled apple trees in front of an old wooden church. The following spring, I returned, hoping to find them again. I must have traversed every rural road in the Uwharries in search of the phantom church and its fabulous fungi, all in vain.

A few words of caution are in order concerning foraging sites. You should be aware that in certain places plants may have been contaminated with pesticides or herbicides. Roadsides are often rich with wild edible plants, but lead from passing automobiles settles on them, so it is best to limit your foraging to roadways with little traffic.

"We generally avoid power lines, public roads, and railroad beds," said Perkins. "They all may be sprayed with plant growth regulators or with specific plant poisons. When you're spraying to control plants, the chemicals are absorbed. They can't be washed off."

Water pollution is also a concern. Plants growing in polluted ponds, marshes or streams may be contaminated by biocides or other harmful chemicals, runoff from fertilizers, or sewage containing dangerous bacteria. So, be aware of what's adjacent to or upstream from your collecting site.

Finally, before you go into the wilds to gather your free lunch, a few words about conservation and ethics. You should be aware that in most public parks it is illegal to disturb plant or animal life—and on private land, always ask permission before foraging. Also, learn which plants in your area are threatened or endangered species. These should be harvested only in an emergency survival situation.

"We're guests on the land," Perkins reminds foragers, "and we want to leave the land looking the same as it did when we came in. If you go into a bed of violets, you pick some leaves, you pick some flowers, but you always leave more than you collect. If you can't get enough in that bed, go on to another one somewhere else. And if you're only going to eat the leaves of the plant, just pick the leaves, don't take the whole plant. We want our youngsters to go out and eat wild foods, too!"

Once a person has gained an appreciation for the complex interrelationships that exist in nature, he is more likely to understand the need for conservation. This may be the greatest benefit to be derived from foraging. The enjoyment of a wide variety of tasty and nutritious foods is an added bonus! ⊠

## A Wild Foods Library

If you would like to learn more about wild foods, here are some excellent (and easily obtainable) references:

*Stalking the Wild Asparagus*, *Stalking the Blue-eyed Scallop*, and *Stalking the Healthful Herbs*, by Ewell Gibbons (New York: David McKay Co., Inc.).

These books include some of the most common edible wild foods, with detailed instructions on how to use them. Gibbons was extremely cautious in researching plants for edibility, so you can be confident that anything he recommended is absolutely safe. He also includes very interesting historical notes.

*Field Guide to Edible Wild Plants of Eastern and Central North America*, by Lee Peterson (Houghton Mifflin Co., Boston, Mass., 1978).

Volume 23 in the Peterson Field Guide Series. It includes illustrations and descriptive information on 373 species, including some poisonous plants which could be easily confused with edible species. In addition, it is cross-referenced in several handy ways: by habitat, by season it is available, and by use (candies, teas, cooked vegetables, greens, etc.).

*Feasting Free on Wild Edibles*, by Bradford Angier (Pyramid Books, New York, NY, 1975).

A one-volume edition of two books by Angier (*Free for the Eating* and *More-Free-for-the-Eating Wild Foods*), this book is similar in format and content to Gibbons' books.

*Mushrooms of North America*, by Orson K. Miller Jr. (E.P. Dutton, New York, NY, 1979).

If you decide you're ready to tackle mushrooms, this book is the best field guide I have seen. The photographs are excellent (all color) and the descriptive information is detailed and clear. It indicates whether each species is poisonous or nonpoisonous, and lists edible species as edible, good or choice. In some cases edibility is listed as unknown, and it probably wouldn't be a wise idea to experiment with these.

"Wild Greens of North Carolina"

A pamphlet from the N.C. State Board of Health, Box 2091, Raleigh, NC 27602.

*Opening Days In April*

## Outlook Good For Trout And Turkeys

*Written and Edited by Mark Taylor*

April is a month of opening days, especially for trout fishermen and turkey hunters.

Fishermen don't have quite as long to wait as hunters, however. Trout season opens on Saturday, April 5, and there will be no shortage of fish or fishermen in North Carolina waters.

"We plan to stock over 600,000 brook, brown and rainbow trout in general waters this year," said Richard Guier, Mountain region fisheries supervisor for the Wildlife Commission. "We try to stock about 50 percent of the fish during March and April so that streams are well-stocked on opening day and in the following weeks when interest in fishing peaks. The remainder of the fish will be stocked through the summer into early fall. Most fish will be stocked at a length of 8 inches. About 10 percent of the fish, however, will be larger, ranging from 10 inches to over 12 inches."

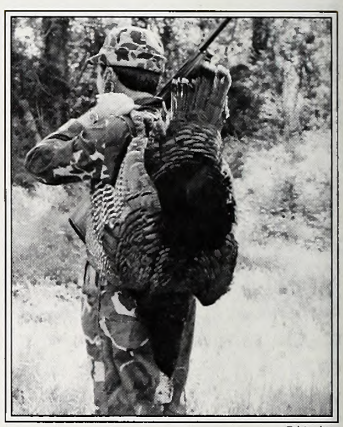
The hunting season for wild turkeys (bearded birds only) opens a week later on Saturday, April 12, and runs through May 10.

"The prospects for a successful turkey season are very good," said Brian Hyder, wild turkey project leader for the Wildlife Commission. "We had a dry spring and summer last year which resulted in excellent hatching and survival of young birds. We also had a better than average mast crop in most of the state. The birds had plenty to eat, and were in good shape going into the winter. If we have favorable weather during the hunting season, the harvest should be right up there with last year's. In 1985, hunters harvested a record 509 birds."

Hyder reminds hunters that they should tag and report their harvest. "This is not only required by law, but is also one of the best tools we have for monitoring turkey populations. Harvest figures are an excellent indicator of whether a turkey population is stable, growing, or declining. Also, hunters need to be aware of a law which was recently passed in the General Assembly. This new law prohibits use of rifles when turkey hunting, and goes into effect this season."

Hyder estimates the turkey population in North Carolina at about 14,000 birds. That's almost triple the number of birds that the state had in 1970 when the Wildlife Commission began its wild turkey restoration project.

"Wild turkeys are now found in every region of the state," he said. "In the Coastal Plain, there's good turkey populations on Camp Lejeune and along the Roanoke River. There are also a lot of birds in Caswell County in the Piedmont, in the northwestern counties, and on the Nantahala and Pisgah national forests in the far western mountains."



Ed Jenkins

***Bringing Home The Bird:*** *The seasons for wild turkey and trout open this month, and the outlook for both is good.*

### Field Notes

**Open Seasons:**

Trout - April 5th through Feb. 28, 1986. See regulations digest for bag limits and lure restrictions.

Wild turkey - April 12 through May 10. Bearded birds only. Daily bag limit one bird with a season and possession limit of two birds. See 1985-86 *Regulations Digest* for counties where season is closed, and for other details.

**Major Regulations Changes:**

Rifles may not be used to hunt wild turkeys. Became effective July 1, 1985.

*Kids Learn About Waterfowl*

## Greenwings A Great Adventure

Ten lucky youngsters who have a strong interest in waterfowl had the time of their lives last November. They were part of Ducks Unlimited's Greenwings program, and their names were drawn at random from Greenwings members across the state. The prize was the chance to participate in the first annual North Carolina Greenwings Adventure.

The three-day outing included visits to the Pea Island Refuge and Lake Mattamuskeet where the youngsters learned about wildlife management and helped refuge personnel live-trap, identify, band and release waterfowl. The youths also learned about the colorful history of waterfowling in Currituck County, and visited the Wright Brothers Memorial, Jockey's Ridge, and the Bodie Island Lighthouse.

"All of the kids had a great time, and we're very pleased with the first annual Greenwings Adventure," said Martin Lang of Kinston, Greenwings Program Chairman for Ducks Unlimited in North Carolina. "We greatly appreciate the help provided by federal and state wildlife personnel, and also the many sportsmen who assisted with the program. We're hoping to expand membership in the Greenwings program this year. There are only 1,200 members in the Greenwings program compared to 17,000 members of Ducks Unlimited in North Carolina."

Greenwings is the youth version of Ducks Unlimited, and young people under the age of 18 are eligible. Membership includes a subscription to Ducks Unlimited magazine, and many DU chapters host Greenwings events. For more information write to Ducks Unlimited, P.O. Box 66300, Chicago, Illinois 60666.

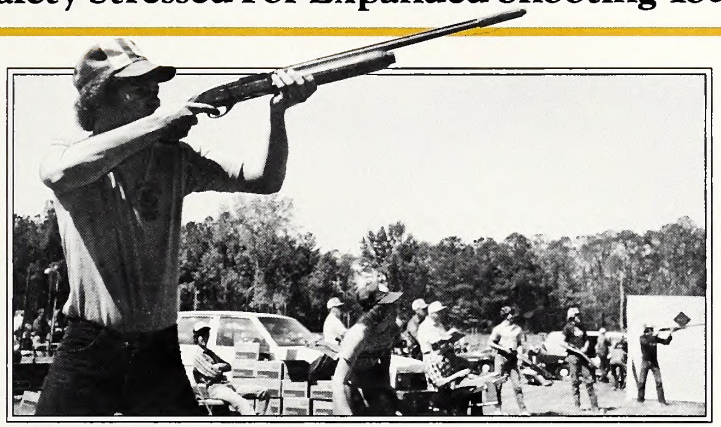
—*Mike Overton*

*Tough Competition Expected*

## Hunter Safety Stressed For Expanded Shooting Tournament

The bullseye on a lot of targets will be ventilated during the eighth annual North Carolina Hunter Safety Shooting Tournament later this month. The annual event is sponsored by the N.C. Wildlife Resources Commission, and will be held on Saturday, April 26, at the Kinston Police Range south of Kinston on Highway 11. Only registered schools may compete, but spectators are welcome.

"We've changed the format of the tournament this year," said Capt. Wilton Pate, tournament director. "We're holding a qualifying tournament in each of the nine wildlife districts of the state. Schools which shoot qualifying scores in the district tournaments will be eligible to compete in the state tournament. Overall, this will increase participation by reducing the travel required for many schools. We anticipate having about 300 to 400 participants representing 50 to 60 schools at the state tournament. As in years past, all participants must be members of school teams and must also have successfully completed a Commission-sponsored hunter-safety course."



Ken Taylor

***Be Ready On Pull:*** *Trap shooting is one of the three events included in the eighth annual North Carolina Hunter Safety Shooting Tournament, which will be held on Saturday, April 26, at the Kinston Police Range.*

Teams will compete in small-bore rifle shooting, trap shooting and archery. For the first time, orienteering will be offered as an option. Orienteering teaches map reading and compass skilsl.

"We've added orienteering as an option because it is included in the North American Hunter Education Championship," said Pate. "This championship is sponsored jointly by the National Rifle Association and the North American Association of Hunter Safety Coordinators. School teams from throughout the United States and Canada participate, and the winner of the state tournament will be eligible to compete. Last year, Ledford Senior High School in Thomasville won this event. The North American Hunter Education Championship will be held in North Carolina this year at Camp Lejeune from July 23-27."

Volunteers are needed to help at both the state and North American tournaments, and interested wildlife clubs should contact Capt. Wilton Pate, 802 Pinewood Drive, Ayden, NC 28513.

*Federation Outings Are Popular*

## Ranger Rick Camps, Summits Slated

Thinking about summer camp? Consider participating in some of the activities offered by the National Wildlife Federation in the North Carolina mountains.

Two programs for youths, the Ranger Rick Wildlife Camp and a Teen Adventure session, are offered, and each runs for two weeks. The Ranger Rick Wildlife Camp introduces youngsters from age nine and up to nature study, ecology, conservation, and such outdoor sports as hiking and fishing. Sessions will run from June through August.

The Teen Adventure session (June 22 through July 1) is for young people from ages 14-17. It features backpacking in the Pisgah National Forest, and culminates with a rafting trip on the French Broad River. Participants master outdoor living skills, and also sharpen their environmental understanding through investigations of various ecosystems.

Conservation Summits are for everyone — including children, parents and single adults. The North Carolina Summit will be held from June 21-27 at the Blue Ridge YMCA Center in Black Mountain. Summits include classes on various aspects of nature study, Appalachian folklore, hiking, camping, and many other outdoor activities. Conservation Summits are also held in Colorado and Maine.

For more information, write to the National Wildlife Federation, 1412 16th St. N.W., Washington, D.C. 20036.

National Wildlife Federation

***Days to Remember:*** *Ten lucky youngsters learned about waterfowl and its management last fall through a Greenwings Adventure. Larry Ditto, manager of the Lake Mattamuskeet National Wildlife Refuge, gave the youngsters a special tour.*

*Eats Hand-Fed Worms*

## Friendly Bass Hangs Around Fontana Dock

The old saying "There's more than one way to catch a fish" has given encouragement to many frustrated anglers. However, Jeff Mathis of Bryson City tells a tale which puts new light on the old saw.

In the summer of 1985, Jeff, whose parents own and operate Almond Boat Park on Fontana Reservoir in Swain County, noticed a 4-pound largemouth bass hanging around the boat dock. "He would just swim around the surface," Jeff recalled, "and I decided to try and feed him some nightcrawlers. He really liked them."

Jeff was interested in the fish, and he decided to see just how close the bass would come to take the worm. With time and patience, the fish kept coming closer until one day he ate a worm out of Jeff's hand.

According to Jeff's mother, Jo, the fish soon acquired the name of Sam and followed Jeff around the dock like a dog. "I'd be pumping water out of a boat," said Jeff, "and look around and there would be Sam, swimming beside me." This relationship between Jeff and the fish continued throughout the summer, and the Mathis family became so attached to the fish that they erected a "No Fishing" sign to prevent someone from catching him.

However, one day someone did. It was a little boy who really didn't know what he had done. Luckily, Jeff was nearby and he gently removed the hook from Sam's mouth and released him. Sam didn't return for several days, and Jeff was beginning to wonder if Sam was feeling he had been betrayed. One day, to his surprise, the bass came back.

Sam stayed all summer at the boat dock, accepting handouts and entertaining the fishermen and boaters. In fact, Sam ate so many worms that Jo estimated the fish gained 1½ pounds. Jeff, who operated the worm concession, complained one day to his mother that, "He only eats worms, and they're money."

In the fall, Sam deserted the boat dock because of falling lake levels, but the Mathis family has a bet going that Sam will return this year.

*—Jay Davies*

Jo Mathis

***A Guy And His Fish:*** *"Sam the Bass" was a regular fixture around the Almond Boat Park on Fontana Lake last summer.*

*Chickadee Trapped*

## Bottle Bird Feeder Can Be Deadly

Dear *Wildlife*:

In regard to "Trash Yields Good Bird Feeder" in the December 1985 issue, I am writing to alert your readers to the danger of this type of feeder. In an attempt to use my trash and provide an inexpensive bird-feeder, I constructed a feeder of this type last fall. Pleased with my efforts, I waited anxiously for the first diners. Several days later, I realized that for some reason there were no guests at my feeder. I went out to inspect the restaurant, and much to my dismay I observed the problem —a young chickadee was entrapped in one of the feed holes. The bird had died struggling to remove the feed from the hole in the plastic, and was pinched between the sharp edges of the plastic bottle.

Therefore, I caution the readers of *Wildlife In North Carolina* about the use of such feeders. The few dollars I saved was not worth the mental anguish I suffered knowing that I had constructed a deathtrap for my feathered friends.

*Christopher Mitchell*
*Chestnut Hill, Massachusetts*

*Last Chance To Contribute*

## Nongame Checkoff Keeps Falcons Flying

Ken Taylor

***They Need Your Help:*** *Endangered peregrine falcons are being restored to the North Carolina mountains with revenues from the N.C. Nongame and Endangered Wildlife Fund. This fund also supports management of threatened sea turtles, restoration of endangered bald eagles, and many other activities. You can support this work by contributing to the Fund through a tax checkoff on your 1985 North Carolina Income Tax return. Information is found on page 3 of the instructions accompanying form MD-400.*

## Backyard Buck A Tough Deer

Dear Sir:

Early one morning this fall, my husband left home to pick up the baby sitter. I ran to the back porch to get something, and saw the biggest buck I have ever seen. He was in a field behind the house, and was just looking at the house.

I knew my husband, Steven, would never believe my story so I ran to get my camera. I wanted proof. I was very quiet as I took the picture so I wouldn't disturb the deer. After the picture was taken, I was surprised when he didn't move. Then I walked closer and finally realized that it was a plywood deer painted so perfectly that it would fool anyone! It was put there at night by my husband and neighbor, Jeff Baker, to fool me.

Needless to say, I was the talk of the town for weeks to come. I shot the deer with a camera, but a shotgun would have been useless too.

—*Shirl Minton*
*Roxobel*

*Slated For State Forests*

## Teacher Workshops Focus On Outdoor Learning

If you're an educator who works with youngsters, there are special workshops which will teach you how to use the outdoors as a classroom.

This summer, several five-day, 30-hour Outdoor Education Workshops will be offered jointly by the Wildlife Commission and the N.C. Division of Forest Resources. These workshops carry three continuing education or certificate renewal credits, and focus on the processes of learning in outdoor settings. Skills taught in these sessions can be used by anyone who works with youngsters in kindergarten through grade 12, and in all subjects. The schedule is as follows:

- June 16-20 at Clemmons State Forest in Clayton.
- June 23-27 at Bladen Lakes State Forest in Elizabethtown.
- July 7-11 at Rendezvous State Forest in North Wilkesboro.
- July 14-18 at Tuttle State Forest in Lenoir.
- July 21-25 at Holmes State Forest in Hendersonville.

To register, send your $25 non-refundable check to Virginia Bass, N.C. Division of Forest Resources, Archdale Building, 512 N. Salisbury St., Raleigh, NC 27611.

*Photography, Birdwatching Also Taught*

## Cashiers Retreat Features Fly Fishing

If you're looking for a family outing, don't miss the Spring Conservation Retreat sponsored by the North Carolina Wildlife Federation. This event will be held from May 1-4 at the High Hampton Inn near Cashiers.

This year's retreat will feature famed angler and outdoor writer Lefty Kreh who will teach courses in fly fishing, fly tying, and outdoor photography. Courses will also be taught in trout-stream rehabilitation, ecology of the Southern Appalachians, wildflower and bird identification, and Appalachian folklore. Separate programs will be available for children of all ages.

For more information, contact (by April 15) the N.C. Wildlife Federation, P.O. Box 10626, Raleigh, NC 27605.

*Feeds A Crowd*

## Baked Rockfish A Spring Rite

Spring means rockfish on many North Carolina lakes and rivers, and these fish have been a delicacy since colonial times. You'll find this recipe, which was furnished by Ed Jenkins of the Commission's Division of Enforcement, a real hit at the first spring barbeque.

**Baked Rockfish On A Grill**

*4-5 lb. whole rockfish or half of a large striper*
*6 medium potatoes*
*4 onions*
*2-3 strips bacon*
*salt or garlic salt*
*pepper*
*butter or margarine*
*Worcestershire sauce*

Clean and score fish. Place fish on a double layer of aluminum foil that has been sprayed with Pam. Wrap 2 or 3 strips of bacon around fish and arrange peeled, halved or quartered potatoes and onions around fish. Dot with butter. Sprinkle with salt or garlic salt and pepper and add Worcestershire sauce (about 1 Tbs.) to taste. Wrape securely in foil and place on covered grill. Cook 45 minutes to 1 hour or until vegetables are done.

## The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

**Status on December 31, 1985**

| | Numbers Sold | Revenue Received |
|---|---|---|
| Lifetime Sportsman's License | 15,817 | $4,756,477.34 |
| Lifetime Hunting License | 135 | 26,014.34 |
| Lifetime Fishing License | 968 | 170,762.92 |
| Lifetime Subscriptions to Wildlife in N.C. | 656 | 78,058.69 |
| Contributions | — | 66,045.17 |
| Fund Total: | | $5,097,358.46 |

*Deadline For Orders June 30*

## Sportsman's Stamp Prints On Sale

***Fish Of Your Dreams:*** *Wildlife artist Duane Raver captured a moment every fisherman dreams of — a big largemouth hitting a surface plug — on the 1986 North Carolina Sportsman's stamp.*

*Orders for limited-edition, art prints of this stamp will be taken through June 30, 1986. For more information, write License Section, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.*

| | |
|---|---|
| *1986 North Carolina Sportsman's License Print* | *$90.00 each* |
| *1986 North Carolina Sportsman's License Print Artist Proof* | *$125.00 each* |
| *1986 North Carolina Sportsman's License Mint (Stamp)* | *$7.50 each* |
| *1986 North Carolina Sportsman's License Signed (Stamp)* | *$9.50 each* |

## Calendar Of Events

**April 4-6**
Southern Sports and Outdoor Show at the North Carolina State Fairgrounds in Raleigh. In addition to displays of hunting and fishing equipment, the Wildlife Commission will host a CATCH clinic (youth-fishing program) and seminars on hunter safety and backyard bird feeding.

**April 5-11**
Spring "living history" week at the Duke Homestead State Historic Site in Durham. See and learn how North Carolina farmers lived and worked in the mid-18th century. For more information contact the Duke Homestead Historic Site, 2828 Duke Homestead Rd., Durham, NC 27705.

**April 9-13**
Grifton Shad Festival at Grifton. Features fishing contest, fish fry, canoe race and other events.

**April 27**
Wild Foods Festival at the Schiele Museum of Natural History in Gastonia.

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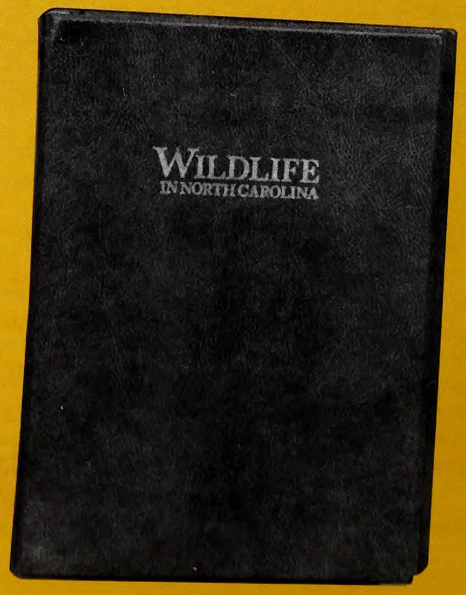

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# WILDLIFE IN NORTH CAROLINA

MAY, 1986

75 CENTS

# Back To The Pamlico

*by Jim Dean*

It was the summer of 1956, and Charlie Ogletree and I were at the ramshackle frame house his parents had leased on the south shore of Pamlico River at Core Point. At 16, we were a pretty unruly pair with plenty of energy, and Core Point's big woods and big water were good places to spend it. We'd stay up half the night in the attic listening to WLAC in Nashville on Charlie's Halicrafters shortwave waiting for Gene Nobles to make one of his celebrated off-color remarks while he advertised Monotone Gutted Mufflers and played rhythm and blues hits by the late great Johnny Ace, James Brown or Ike and Tina Turner (yep, same one).

We drove the wide, straight dirt roads from Core Point to Bonnerton, Edward, and Hobucken listening to "Don't Be Cruel" and "Let The Good Times Roll." But mostly, the good times rolled on the Pamlico River and the many creeks feeding it.

Starting at dawn, we'd take Charlie's 14-foot plywood runabout and the 12-horse Sea Bee and run up or down the river to one of the creeks —Blount's Creek, Lee's Creek, Durham's Creek or South Creek—to fish for bass and robin. Charlie's dad owned an old fish camp called River Haven east of the mouth of Lee's Creek, and you could rent a small cabin from a crusty old river rat named Hudie. We'd visit him just to learn some new words and eat his homemade biscuits, and he never disappointed us with either.

During the afternoons, we'd waterski (darn right you can ski behind a 12-horse motor), or maybe we'd get some shrimp and the cane poles and fish for croakers or gray trout in the main river. There were also softshell crabs in the dense mats of grass as far as you could wade. Even west of Indian Island, you could troll up a few bluefish, and occasionally even a Spanish mackerel because the water was far more salty than it is today. After supper, we might take the skiff, gigs and lantern and go "strike fishing" or "blind stabbing" for flounders. By midnight, we'd be glued to the Halicrafters again, waiting for ol' Gene to commit some airwave atrocity.

If it sounds wonderful, it was. Even given the tendency for memories to improve with age, it was still a pretty good way to spend several weeks each summer. A few years later, however, Charlie's father decided to sell River Haven, and the family gradually stopped going to the old Core Point house. Charlie hasn't been back, and doesn't want to.

"I'd rather remember it the way it was," he told me recently in a serious moment after we'd been chuckling over some long ago Pamlico shennanigans. For Charlie, it was clear that Core Point, River Haven and Pamlico were like a dead relative in an open casket. In some ways, that feeling is understandable.

You expect some changes as you grow older, but I doubt if anyone anticipated the changes that have occurred in the Pamlico during the past 30 years. After all, the river and sound constitute the second largest estuarine system in the nation. Even so, gone are most of the weedbeds, and the water in many parts of the river is so choked with nutrients and other pollutants that fish are dying of oxygen deprivation or pollution-related diseases or parasites.

Nor is the drop in salinity a mere act of God, a simple matter of fluctuating cycles or too much rain. Decades of agricultural drainage, floodplain development and inadequate sewage treatment aren't acts of God, and that's where a lot of the freshwater runoff and pollutants have come from.

"But there are so many widespread problems that it is difficult to pinpoint a specific source and deal with it," is the explanation you often hear. "You can't blame it all on two or three polluters when you know many others are also at fault. It's not fair."

*N.C. Wildlife Resources Commission*

That seems reasonable until you realize that it may also sound like an excuse. That kind of twisted sense of fair play is killing our rivers and estuaries. In fact, there are sources of pollution that can be pinpointed, and even if we can't identify all of them, it doesn't mean we should be less aggressive dealing with the known culprits. The tendency is to measure benefits largely in terms of jobs created without giving adequate consideration to the regionwide economic benefits of a healthy river. In most cases, it's not a matter of putting polluters out of business, but enforcing more rigid controls. In other instances, it may be necessary to deny permits to any operation that will contribute pollution to an already overly stressed river.

Remember when the fertilizer plant at Tunis on the Chowan River went into operation, and thick, green algae began to cover the river each summer? It was officially another one of those "everybody is at fault" situations, but isn't it an interesting coincidence that there hasn't been a significant algae bloom on the river since the fertilizer plant closed. Sure, there were other causes also contributing to those algal blooms, and the river is still nutrient rich and ripe for a bloom. But the question never answered—or possibly even asked—was this, "What pushed the Chowan beyond the limit?"

That same question seems to apply to the Pamlico where there may be lots of last straws. What has—or will—ultimately push the river past a tolerable threshold? Is it agricultural fertilizer and pesticide runoff? Towns with improper sewage systems? Waterside development? Texasgulf's phosphorus-laden effluent? Channelization and other drainage projects? Will peat-mining drainage be a factor if it's approved? Evidence exists that some or all of these factors have combined to create significant stress on the river and estuary despite some dedicated efforts to ease the burden. It's also fairly obvious that those efforts have been inadequate, and that it may be time to limit any additional pollution to the river and find ways to cut back on present sources that can be pinpointed.

One reason I've never been back to River Haven is because the Texasgulf plant sits next to it. Of course, Charlie's dad didn't know this area was about to become one of the phosphate mining capitals of the world when he sold it, and I doubt if anybody else did either. But the plant is there, and legally releasing millions of gallons of phosphate-enriched water daily into a river already loaded with nutrients. Because of that, it's one of many nutrient sources that may require reassessment.

Lately, I've been thinking about those summers 30 years ago. Naturally, I didn't expect ol' Hudie to live forever, and it's no surprise to hear that the house at Core Point has fallen in. I even suspected Charlie and I would grow up someday, but I didn't figure I'd live to see the Pamlico River fighting for its life. I'm not that old.

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# WILDLIFE IN NORTH CAROLINA

*Wildlife In North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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**Cover** *It takes fishing skill and an enticing lure to hook a lunker largemouth bass, and it's a good bet that more big bass are caught on plastic worms than any other artificial lure. Hanson Carroll photographed this leaping largemouth.*

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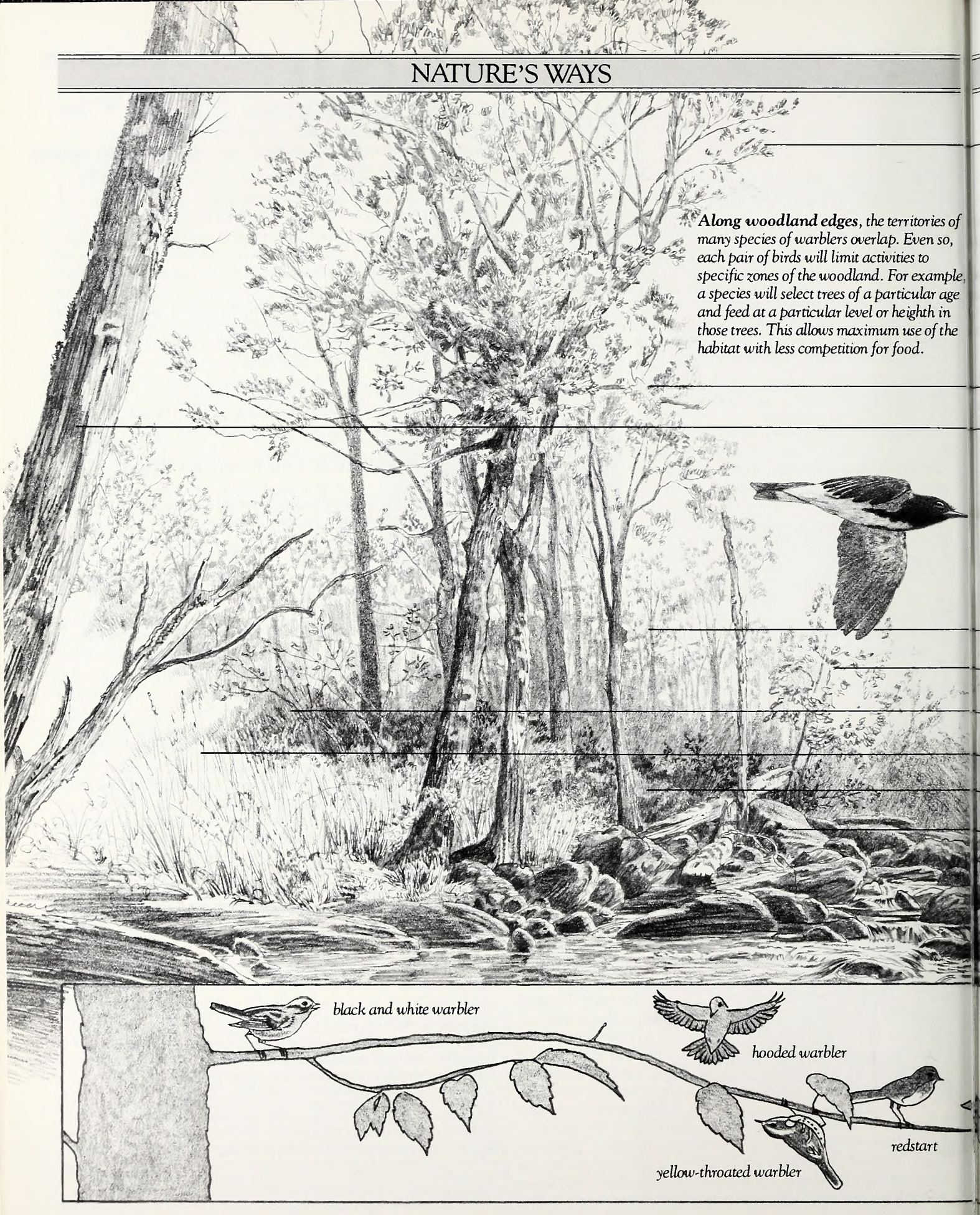


**Along woodland edges,** *the territories of many species of warblers overlap. Even so, each pair of birds will limit activities to specific zones of the woodland. For example, a species will select trees of a particular age and feed at a particular level or heighth in those trees. This allows maximum use of the habitat with less competition for food.*

# Summer Warblers In The Backyard

*written by David Lee / illustrated by David Williams*

redstart

yellow-throated warbler

black and white warbler

hooded warbler

prairie warbler

chat

yellow-throat warbler

ovenbird

Lousiana waterthrush

***Even on a single limb**, each species of warbler seeks out a predictable location to feed. Aerial feeders such as redstarts will be found on the outer twigs, while other species patrol the inner limbs and twigs.*

Ever wonder how plants and animals divide a common habitat so that each has what it needs to survive? Some of the best examples of this division of resources are found in the familiar plants and animals of your backyards — warblers, for example.

Backyard warblers are colorful, vocal and diverse. In fact, after the busy spring migration period is complete I can normally find seven to 10 species in my Piedmont backyard that will nest and remain until the fall. Each of these species needs a particular kind of habitat in which individual nesting pairs establish and defend territories. While there is some room for overlap, each exploits a portion of my backyard habitat for its own needs, without imperiling its neighbors.

Warblers distribute themselves in two dimensions — horizontal and vertical. The horizontal dimension varies considerably from site to site. In my wooded yard it starts with a distinct edge where a pasture meets my wood lot. It extends through an open pine, early-growth hardwood forest and terminates in a moderately closed understory along a small stream.

Along the woodland edge several warblers find habitat that is not available in the interior of the wood lot. In blackberries and honeysuckle that dominate the fence row, yellow-throats, yellow-breasted chats and in some years prairie warblers set up territories and raise their young. In the red maple that hangs over the fence row can be found one or two pairs of American redstarts. They too are a species that likes edges and openings in woodlands. Throughout the woods are other species — pine warblers, ovenbirds and black-and-white warblers — that do not seem to require edge to meet their needs.

Hooded and Kentucky warblers confine their activities to the dense vegetation by the stream, where they find good cover in the well-developed understory. Along the stream itself is a pair of Louisiana water thrushes, birds attracted to running water more so than to stages of woodland development.

Looking at the vertical dimension now, we find an additional pattern. The ovenbird and Louisiana waterthrush confine their activities to the ground or nearly so. The ovenbird hunts for its insect prey in fallen leaves, the waterthrush on rocks along the edge of the stream. Higher in the trees are the redstarts, pine warblers and black-and-white warblers. Pine warblers normally feed on leaves and branches throughout mature trees and as their name implies, they prefer pines. The remaining species centralize their activities in the understory and subcanopy.

Closer study shows that each species is specialized within a particular stratified zone of the forest. Some birds feed exclusively on the outer tips of branches, while another warbler in the same tree may confine its feeding to the interior limbs and trunks. American redstarts, for example, perch on outer limbs and take flying insects from mid-air, while black-and-white warblers patrol the limbs and trunk like nuthatches looking for insects in bark crevices. Indeed, some warblers peer upward while foraging for food, while others peer downward. Thus, these birds would find insects the other missed even if they fed from the same branch.

A third dimension, one I have not discussed, is simply the size of the woodlot. This determines how common particular species can be at a given site. Long, extended edges favor one group of birds, while acres of dense understory favor another. The more complex and diverse the habitat, the more species that can be packed into it. The more uniform the habitat, the fewer species there will be but those present are often quite abundant.

Ken Taylor

**Agriculture** *(right) and forestry are the dominant uses of land in the Pamlico-Tar River watershed, and contribute greatly to pollution and siltation in the estuary.*

by Mark Taylor

# Trouble On The Pamlico

The vast Pamlico and its priceless estuarine fisheries are threatened by an overload of nutrients and fresh water. What are the sources of this pollution, and what can be done to control it?

Willie and Feather Phillips know the Pamlico River well. Their house on Bath Creek is surrounded by stacks of crab and eel pots, and they are among the area's most successful commercial fishermen. They know where the best crabbing spots are, and how the phase of the moon affects the shedding of the "sooks" and the "jimmies." Five seasons ago they came to Bath from the Wilmington area with a 15-foot skiff and an old outboard motor, determined to live off the water. That was the year, they recall, that the flounder began dying.

"We hauled up whole nets full of dead fish," said Willie. "A couple of years later, another disease began killing the menhaden. These fish were literally being eaten alive by deep, red, ulcerous sores. Millions of juvenile menhaden were dying, too — they are the basic forage fish in this estuary. It makes you angry."

The Phillips aren't the only ones who are angry at what is happening to the Pamlico River. Scores of commercial and sport fishermen, conservationists and biologists are dismayed at the river's apparently worsening health. Like the Phillips, they can tell you about fish kills, about the disappearance of aquatic grasses, about the algae that appear more often in the river now. And increasingly they're blaming freshwater drainage, industrial spills and nutrient pollution for the river's condition. Indeed, they're convinced that pollution is pushing the estuary to its very limits.

Something is happening to the Pamlico, there's little doubt about that. The signs of the river's distress are unmistakeable. The flounder kill in 1981 affected over 30 miles of the river from Blount's Bay to Rose Bay, destroying untold numbers of fish. Its exact cause was never determined. When other fish — mostly menhaden, but others as well — began to die a few years later, researchers at N.C. State University found that the disease was not a severe case of "red sore" as was first suspected. Instead, they found two fungi in the sores that are normally found in freshwater where they cause only superficial, cottony skin growths. Researchers have found no evidence of anything like this happening before in the Pamlico.

Puzzling also has been the disappearance of the aquatic grass beds that once lined the Pamlico River. Recent aerial surveys over areas that were thick with grass beds 10 years ago found no plants whatsoever. Property owners have said the grass disappeared six years ago.

Both natural and manmade causes are suspected in the disappearance of aquatic grass and outbreaks of fish disease, but increased scrutiny is being directed at the stuff that's entering the river along its entire length. Particularly implicated are discharges of the nutrients nitrogen and phosphorus, and freshwater drainage. The Pamlico's problem, many say, is that there are too many nutrients and too much fresh water in the river.

"The problems we're seeing on the Pamlico are very similar to what's happened to Chesapeake Bay," said Jim Mulligan, supervisor of the Washington Regional Office of the N.C. Division of Environmental Management (DEM). "The Tar, Pamlico and Neuse rivers drain farmland, forests and cities throughout much of the Coastal Plain and Piedmont, and sooner or later everything that is discharged or washed

***The Pamlico River and Sound*** *(left) is the nation's second largest estuary and one of its most productive fishing grounds. Water quality in the estuary has suffered in recent years, threatening the fish populations and the livelihoods of many fishermen.*

"We've hauled up whole nets of dead fish. They were literally being eaten alive by deep, red, ulcerous sores. It makes you angry."

— *Willie and Feather Phillips*

Mark Taylor

*Willie, Feather and Jake Phillips*

into the water ends up in the Pamlico River or Sound. We've apparently crossed a threshold which is manifesting itself in all sorts of things — algal blooms, fish diseases, loss of vegetation and so on."

Nutrient pollution is a particular problem for the river. Nutrients are generally beneficial, if applied in the right places and in the right quantities. But the results may not be so good if they enter a river system in unusual quantities. High levels of phosphorus and nitrogen in the Pamlico have been linked in recent years to increased growths of algae, as measured by the amount of chlorophyll in the river. Two types of algae are found in the Pamlico — filimentous algae, which attach to the bottom and commonly begin growing in late spring and through the summer, and phytoplankton, free-floating algae that can't be seen by the naked eye. A winter bloom of phytoplankton normally occurs in the river although summer outbreaks have occurred recently. The large and foul-smelling mats of blue-green algae that scum the surface of the lower Neuse River are not found on the Pamlico because they can't tolerate its saltier waters.

While algal blooms have always occurred seasonally on the Pamlico, today the situation has changed considerably. "Nutrient levels are high enough in the river for an algal bloom to happen almost anytime," said Mulligan. "It's just a matter of some other factor such as temperature or changes in salinity levels triggering the bloom."

These algal blooms have a host of destructive effects on commercial fisheries. "In late summer, when there's little wind and low runoff," said Terry Sholar, a biologist with the N.C. Division of Marine Fisheries, "the water often stratifies into heavier salt layers below fresh water layers. Fish prefer to stay in the layer of salt water on the bottom. If an algal bloom occurs, the dead algae sink to the bottom and decay. The process of decomposition uses oxygen, and sometimes this can rob the water of all its dissolved oxygen, causing fish kills. This situation sometimes occurs naturally, but it's more prevalent now that the system is loaded with nutrients."

Sholar says that the algae also increase stress in fish and contribute to disease outbreaks. In addition, high algal levels cause larval fish to alter their diets, lowering the productivity of the population.

High nutrient levels may also accelerate the depletion of oxygen in the water without causing an algal bloom. "This has always occurred to some extent," added Sholar. "However, when I started working in Washington in 1978, problems with dissolved oxygen were confined to the upper portions of the estuary — from Bath Creek and Blount's Bay upstream. Now the problem extends down to the mouths of the rivers. In 1984, all of the bottom waters in the Neuse and Pamlico rivers were completely depleted of oxygen and so was the whole western portion of the sound."

The effects were alarming. Fish can move out of these areas, but oysters can't. What lived there died, even the oysters and clams which can both survive long periods of low oxygen. This was something new.

Fishermen have a colorful name for this oxygenless condition — they call it "dead water."

"Dead water is one of the most frustrating aspects of fishing," said Willie Phillips. "You can't see dead water, but it has a bitter taste and seems to move in and out from shore without breaking down. It roams indiscriminately, and will hit a handful of pots in a string and then retreat. The pots are stripped clean and everything in them is dead. The crabs are bleached white and begin to rot and fall apart in just a few hours. This situation forces everyone to fish in the shallows where the wind keeps the water stirred up and oxygenated. Once you close ranks, there's very little room and you tear up more gear. This creates a lot of resentment among fishermen."

Ed Noga

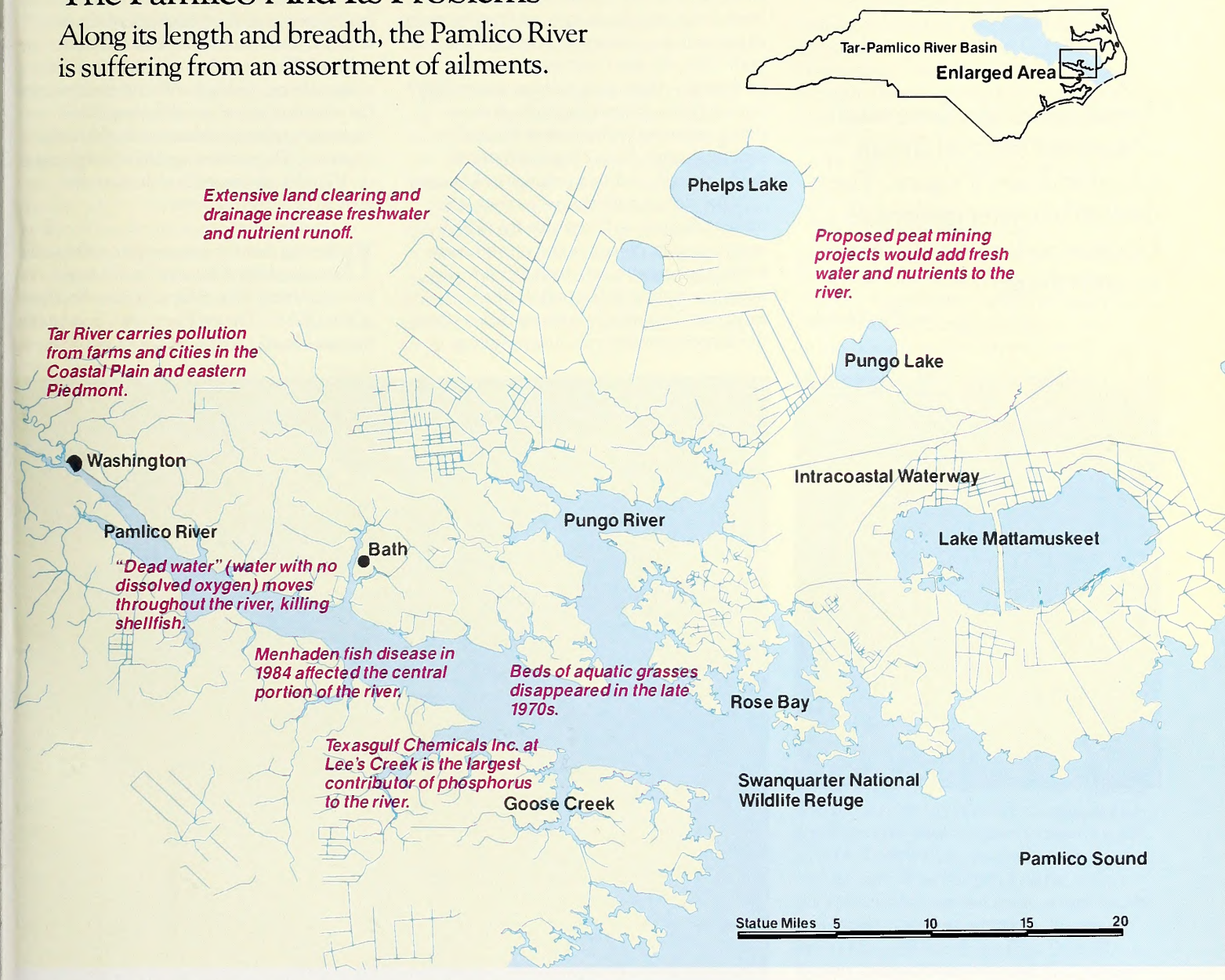
***Gruesome sores** on these perch were caused by a mysterious fish disease that killed millions of menhaden and other fish in the Pamlico River in 1984.*

Where are these nutrients coming from? They enter the river from many sources. According to figures compiled by DEM runoff from farming and forestry operations accounts for approximately 75 percent of the nitrogen that is deposited in the Pamlico River annually, and discharges from municipal sewage-treatment plants and industries are responsible for most of the remainder. The same sources also contribute the phosphorus in the Pamlico.

While both nitrogen and phosphorus are necessary to trigger an algal bloom, one may

# The Pamlico And Its Problems

## Along its length and breadth, the Pamlico River is suffering from an assortment of ailments.




be more crucial than the other depending on whether they are in a freshwater, saltwater or brackish-water system. Most biologists believe that it's the sudden pulses of nitrogen into the Pamlico from heavy rains and subsequent runoff that trigger the algae blooms. But that doesn't necessarily make nitrogen the main problem. The nitrogen wouldn't produce these effects, some say, if the water wasn't already loaded with phosphorus.

The largest single contributor of phosphorus to the Pamlico is the mammoth, open-pit phosphate mining and processing plant operated by Texasgulf Chemicals Incorporated at Lee's Creek near Aurora. Beginning its operations in 1964, Texasgulf is today one of the nation's largest producers of phosphoric acid for fertilizers. Texasgulf annually discharges approximately 353 metric tons of phosphorus — roughly 3,000 pounds a day — into the Pamlico, accounting for 34 percent of the total phosphorus entering the river from all sources. (Municipal sewage-treatment plants contribute another 26 percent, according to DEM's figures.)

Opinions differ over the role these discharges play in the river's water-quality problems. Texasgulf officials question whether their discharges are significant. They cite research by Dr. Donald Stanley of East Carolina University who has monitored the water quality of the river without finding a direct link between the company's discharge and increased algae growth.

"We monitor Texasgulf's discharge, and in terms of algae we haven't seen any impacts," said Stanley in a recent interview. "We don't see elevated levels of phytoplankton (algae) near the mine, although we often see higher chlorophyll levels there than in other parts of the estuaries." Chlorophyll is a pigment produced by phytoplankton during photosynthesis, and is used by the state as an indicator of algal levels.

Stanley says that nutrients aren't the only factors that affect the growth of algae. Sunlight, water temperature, salt content — all may encourage algae growth. "Looking at phytoplankton levels, the Pamlico doesn't stand out as being unusually high or low compared to the other estuaries in the Southeast."

Dr. Edward Kuenzler of the University of North Carolina conducted a study with Stanley of the Pamlico from 1975 to 1977, and he feels that Texasgulf has had an impact on the river. He adds, though, that the plant's location in the middle of the estuary complicated the matter.

"When we looked at our data gathered

"Twenty years ago, there was a big oyster rock off Indian Island and now it's gone. There used to be oyster gardens in Goose Creek, and now there's no such thing."

*—Etles Henrie*

Mark Taylor

*Etles Henrie*

from 1975 to 1977, there appeared to have been some increase in algae and productivity in the river since Texasgulf opened," Kuenzler said. "But, the algae still wasn't causing problems — there were no blue-green algae, scums, or fish kills at that time. It was a richer, more eutrophic system but still a healthy system. I don't know if that still holds, though. A lot can change in 10 years.

"Circulation patterns in the river also make it difficult to determine the plant's exact impacts. Nitrogen and phosphorus levels, algal growth, and turbidity are normally highest in the middle of all estuaries. This occurs because this is where the denser saltwater pushing upstream meets the downstream flow of less dense freshwater, and all of the particulates are recycled continuously up into the water column. This recycling of nutrients from many sources makes it difficult to determine the effects of the mine. If Texasgulf is causing nutrient problems, it might not be apparent. The problem could be cropping up 10 miles upstream or downstream instead of at their doorstep."

Believing that the company's contribution is indeed significant is Dr. George Everett, chief of the Water Quality Section of the DEM. "The problem with Texasgulf is the mass loading of phosphorus into the

***Farms, industries*** *and urban development are all implicated in the Pamlico's worsening health. The Texasgulf Chemicals complex (right) near Aurora daily discharges approximately 3,000 pounds of phosphorus into the river, making it the largest single contributor of this nutrient to the system. Yet runoff from farms like the one in the foreground at right is the predominant source of another nutrient, nitrogen. The two nutrients are linked to increased algae growth in the estuary. Freshwater drainage from extensive logging and farming operations (far right) lower salinity levels in the river, threatening shellfish nurseries and breeding areas.*

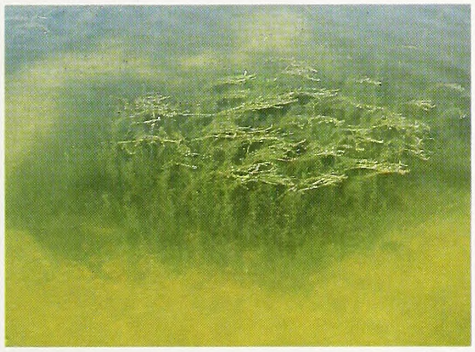
river caused by their high flows," he said. "We find chlorophyll levels in excess of our water-quality standards at the site in both winter and summer. In this portion of the estuary, nitrogen is triggering the blooms only because the system is already overloaded with phosphorus. Anything we can do to reduce nutrient levels will help—we only have to look at Chesapeake Bay as an example."

To reduce the amount of phosphorus Texasgulf is discharging into the river, DEM would have to change the conditions of the wastewater-discharge permit that it has issued the company. This permit, which has expired, limits the amount of phosphorus concentration in the company's discharge to a daily average of 35 parts per million, but the total amount of the discharge—mostly water—is not limited under any permit. Thus, the greater the flow the more phosphorus enters the river. Texasgulf has applied for a new permit, and DEM officials are considering establishing an upper limit to Texasgulf's discharges. According to Meg Kerr, environmental modeling supervisor for DEM, "We're looking closely at the issue of total flows and concentration limits as we review this permit."

Texasgulf wants its permit to be reissued without changes. Doug Mercer, environmental superintendent for the Aurora facility, says, "The Environmental Protection Agency spent several years evaluating the quality of discharges from phosphate facilities and established acceptable effluent limitations. We feel that those are the limits that should remain in our permit unless there is some demonstrated need or documentation that supports a lower limit."

The discharge is not the only problem involving Texasgulf that may affect the river and its tributaries. A recent clay spill into South Creek has focused attention on Texasgulf's clay or "slime" ponds.

Officials are not sure of the effects of the spill, although they feel sure it smothered bottom-dwelling species that are part of the aquatic food chain. Conservationists and fishermen feel that the spill isn't an isolated incident and could be a harbinger of a bigger disaster to come.



Steve Reed

***The dense grass beds** that lined the Pamlico River disappeared in the late 1970s, probably because of a combination of exceptionally cold temperatures and unusually high salinities.*

Ken Taylor

"The break in this pipe was an accident waiting to happen," said Todd Miller, executive director of the N.C. Coastal Federation. "We feel that the slime ponds are a time bomb waiting to go off. The dikes have been eroding, and a hurricane could breach the walls. If that happened, it would be the end of that portion of the river."

While point sources, such as Texasgulf and municipal wastewater-treatment plants contribute to the Pamlico's nutrient loads, there are other sources. Nonpoint sources of nutrients—which include runoff from farms, timbering operations, and urban development—are responsible for 75 percent of the Pamlico's nitrogen and 38 percent of its phosphorus loads. This runoff also carries heavy loads of silt in addition to herbicide residues, heavy metals, bacteria and other pollutants.

Limiting the amount of nutrients entering the river from these sources is more difficult than from point sources like industries. The most effective controls for nonpoint source pollution are incorporated into DEM's program for nutrient-sensitive waters. This program is designed to reduce nutrient pollution, and may only be applied to waters with demonstrated nutrient problems which are often manifested in algal blooms. To reduce nutrient runoff, farmers can receive partial funding for conservation measures they implement on their farms. These "best-management practices" include comprehensive soil testing to prevent excessive use of fertilizer, and ways to control erosion such as no-till cultivation, grassed waterways, and terraces. Discharges of nitrogen and phosphorus from point sources may also be regulated under this program. To date the upper Neuse River above Falls Dam, B. Everett Jordan Reservoir, and the Chowan River have received nutrient-sensitive designation. The lower Neuse, Pamlico and Tar rivers are being studied by DEM for designation.

"We're strongly in favor of designating the Pamlico-Tar basin and the lower Neuse River as nutrient sensitive," said Jonathan Phillips, executive director of the Pamlico-Tar River Foundation. "We feel the data shows that nutrients must be controlled from all sources, and that agricultural runoff—with its heavy load of silt and nutrients—is the most serious problem facing the river. We believe the only way to control both silt and nutrients is with the implementation of the 'best-management practices' outlined in the DEM nutrient-sensitive program."

While nutrient pollution is a persisting problem for the Pamlico, another pollution problem has been directly tied to

**Commercial fishermen** *(above) catch up to 70 million pounds of fish and shellfish in the Pamlico River and Sound annually. Shrimp fishermen like the men working this trawler see a direct link between increased freshwater drainage and reduced shrimp catches.*

Mark Taylor

**Grassed waterways** *(right), terracing and no-till cultivation are some agricultural practices that could control soil erosion and reduce nutrient runoff from farmland by one third. In the long run, these practices also save money for farmers through reduced fertilizer costs.*

losses of fisheries production. Excessive freshwater drainage and runoff are causing an imbalance in the river's salinity, a crucial element in finfish and shellfish productivity.

Freshwater runoff and drainage primarily affect nursery areas — small creeks, marshes and shallows that offer food and cover for juvenile fish and shellfish. There are 77,000 acres of designated primary nursery areas statewide, 15,000 acres in Pamlico Sound and its tributaries alone. The Sound and River are so productive that they contribute disproportionately to the commercial fishing harvest. A staggering 60 to 70 percent of North Carolina's inshore and offshore commercial catch is dependent at one stage or another on the Pamlico and its tributaries. In an average year, these waters yield up to 70 million pounds of shrimp, flounder, menhaden, spot, crabs, oysters, trout and other commercial species to the nets and pots of commercial fishermen. In addition, the sport catch of many fish probably equals the commercial harvest.

"The clearing and draining of the Pamlimarle Peninsula (the land between the Pamlico and Albemarle sounds) have been so extensive," says Sholar, "that very few primary nursery areas haven't been affected to some degree by them. Juvenile fish and shellfish need specific salinity concentrations, and there are two problems associated with all this fresh water. The first is a local problem. For example, a ditch or canal from an agricultural or forestry operation feeds into the head of the nearest creek which happens to be a primary nursery area. Even a big rain can cause a temporary drop in the salt content and this will often cause juvenile fish and shellfish to move to saltier, more open areas of the river or sound. But in these areas, there's less food and cover and fish and shellfish are more vulnerable to predation.

"The second problem is simply the general decline in salinity levels in the river. The retreat of the oyster beds downriver over the past few decades illustrates this problem."

Etles Henrie of South Creek can tell you a lot about the retreat of the oyster beds. Involved in the fishing and seafood industries for over 30 years, Henrie saw the brackish line gradually move downstream. "Twenty years ago, there was a big oyster rock off Indian Island and now it's gone. There used to be oyster gardens in Goose Creek, and now there's no such thing. These sores on the fish are also totally new. I've never seen or heard of anything like this until the last few years. We've always had fish kills in late summer, but I'd say there's five to 10 times the number there used to be."

Biologists feel that shrimp harvests are one of the best indicators of the problems with fresh water. "Lots of things affect seafood landings such as price, availability, weather and effort," said Dennie Spitzbergen, a shrimp biologist with the N.C. Division of Marine Fisheries. "Shrimp, however, are an annual species, and there's a direct relationship between water conditions in the spring and what shows up in the back of the boat in the summer. Last year is a good example. We had an exceptionally dry spring followed by a prolonged summer drought, and had one of the best shrimp seasons in many years. However, we've reached the point where there's so much freshwater drainage throughout the watershed that we need abnormal conditions for fishermen to have a good year."

The N.C. Environmental Management Commission is considering proposed regulations that would protect designated primary nursery areas from freshwater drainage. These regulations would prevent discharges from causing drastic short-term and long-term drops in salt content. They would also prohibit discharges into primary nursery areas with borderline salinities unless it could be demonstrated that these areas wouldn't be damaged. Three public hearings and a technical session were held on these regulations in 1985. Minor modifications were made, and the new proposals will be presented at a public hearing this summer.

Two proposed peat mining projects in Washington, Hyde and Tyrrell counties may result in increased freshwater drainage. First Colony Farms has again applied for a permit to mine 15,000 acres in these counties. Also, Chicago investor Sam J. Esposito has applied for a permit to mine peat on a 7,142-acre tract next to the Intracoastal Waterway in Hyde County. Esposito leased the mining rights from the John Hancock Life insurance Company.

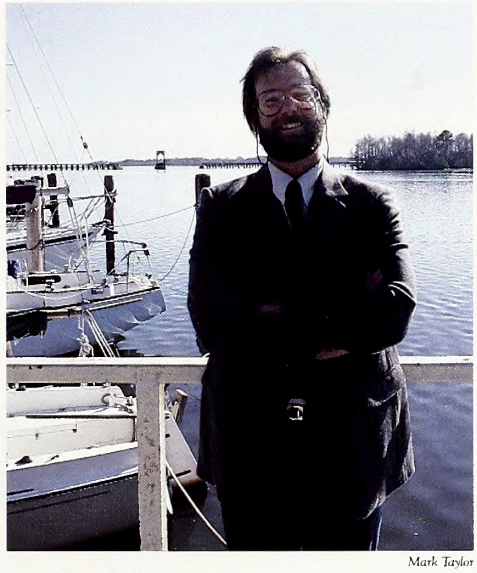
Is the Pamlico River receiving the protection it needs? Fishermen and conservationists don't think so.

"People in this area have watched the salinities move steadily downriver in their lifetimes," said Willie Phillips. "The oyster beds they fished as kids are gone. We lose a creek here, a nursery area there, and bit by bit our fishing grounds are disappearing."

Todd Miller agrees. "The Clean Water Act requires that there be no loss of existing uses of our waters, and the state is responsible for implementing this law. Yet, when you look at the problems with closed shellfishing areas, loss of primary nursery areas, fish diseases, dead water and so on, it's plain that the productivity and uses of the Pamlico are being degraded or lost."

"The data shows that nutrients must be controlled from all sources, and that agricultural runoff is the most serious problem facing the river."

*— Jonathan Phillips*



Mark Taylor

*Jonathan Phillips*

From the air, the waters of the Pamlico are a beautiful sight. A string of deserted barrier islands ring the sparkling blue waters of the sound. From the mainland to the head of the Pamlico River at Washington over 30 miles upstream, crabbers and trawlers ply the waters. From here, you don't see the diseased fish, algal blooms or siltation. What you see is the nation's second largest estuary. A resource, says Jonathan Phillips, "of national significance." An estuary, Terry Sholar points out, that is "one of the most productive fishing grounds in the country." And, Etles Henrie wryly adds, "a river that is one big mudhole — where most of the pollution from the Piedmont and Coastal Plain eventually settles out." ⊠

***In northern latitudes**, the weasel has a summer coat and a winter coat. The summer coat (right) of this long-tailed weasel is brown with white underparts, while the winter coat is all white. In North Carolina, weasels keep their brown and white "summer" coat all year long.*

***Long, tubular bodies** of weasels enable them to crawl through the burrows of meadow voles and other prey species. Weasels are ferocious hunters, often killing more than they need and storing the surplus for another day.*

Photography by Leonard Lee Rue, III

# That Lean & Hungry Look

by Jay Davies

Weasels may kill more than they can eat at times, but that's the way life is for a creature that must eat almost continuously to survive.

How does that nursery rhyme go? Oh yes, I think I remember.

*"All around the cobbler's bench,*
*the monkey chased the weasel,*
*The monkey thought t'was all in fun;*
*POP goes the weasel."*

I'll admit that as a child I always visualized a monkey catching a weasel and squeezing it until it popped. More recently, however, I've been told that the monkey and the weasel in this ancient rhyme refer to shoe-making tools, and have nothing at all to do with animals. If that's true, it won't be the only widespread misconception about weasels.

For most of us, weasels are animals of mystery. Tales abound of them sneaking into chicken coops in the dead of night and leaving a bloody calling card of seemingly senseless carnage—killing far more chickens than they could eat in months, and doing so apparently for the pure pleasure of killing. Of course, it's a bit more complex than that, and with weasels it seems that is often the case. These are curious creatures with complex habits and instincts.

Weasels and nearly 70 other species including the wolverine, fisher, marten, mink, and skunk comprise the family *Mustelidae*. Representatives of this family inhabit terrestrial and aquatic habitats throughout much of the world, except for Australia, the Antarctic, and most oceanic islands. There are three species of weasels in North America—the least, long-tailed, and short-tailed. Only the least and longtail are found in North Carolina. Precise distribution isn't generally known, but least weasels inhabit mountain counties, while longtails are found state-wide. All three species seem to prefer an "old-field" type of habitat where populations of their favorite food—meadow and pine voles—abound. Orchards and woodlot clearings are also popular haunts.

When two different weasel species appear to occupy similar niches—such as in western North Carolina—researchers have yet to understand the mechanisms which prevent one species from out-competing and

thereby eliminating the other. However, some investigators suspect that competing weasels may select different prey or use slightly different microhabitats.

One reason weasels are seldom seen is because they are primarily nocturnal animals. Bill Zielinski, a researcher at N.C. State University, studied the foraging activity of least weasels, short-tailed weasels, and mink in a laboratory environment. He found that weasels were very inflexible in the times they fed, dogmatically choosing the night regardless of when food was most available. Minks, however, rapidly adapted their feeding schedule to the times of day when food was most available. Since weasels are extremely dependent upon voles as a source of food and because voles are primarily active at night, Zielinski suggests that weasels may have evolved a strong genetic propensity to be active at night also. Minks, however, feed on a much wider variety of prey, some of which may be active during daylight hours, and Zielinski suspects this flexible activity pattern allows minks to feed whenever their prey is most active.

Another factor which may have pushed weasels into a nocturnal activity pattern is their vulnerability to predation. Zielinski theorized the camouflage provided by night may reduce predation. Hawks and owls are their greatest enemies, but weasels also face predation from foxes, rattlesnakes, bobcats, blacksnakes, and domestic cats. When one of these predators captures a weasel, the little fellow does not give up easily. In fact, there is an account of a bald eagle, which after being shot, was found to have the bleached skull of a weasel locked in a death grip on its throat.

One curious adaptation the long-tailed and short-tailed weasels have evolved is a black-tipped tail. Dr. Roger Powell, associate professor of zoology at N.C. State University, theorizes the black tip may divert the attack of a predator away from the weasel's body and towards its tail. Such a strategy, he has shown, increases the weasel's chance of escape. Interestingly, the black tip is not present on the least weasel, but Powell explains that this may be because their tails are too short to effectively divert an attack away from the body.

Life is never easy for a weasel. While weasels may potentially live several years, many never reach their first birthday. Because their lives are often terminated early, weasels have evolved a precocious reproductive strategy. Most female least and long-tailed weasels are sexually mature at three to four months of age. Least weasels are able to breed throughout the year and produce one, sometimes two, litters of three to six young each, in a year. Long-tailed and short-tailed weasels, however, produce more than one litter of six to nine young each year.

Oddly enough, the time between fertilization and birth of this one litter is nearly 10 months! This long gestation is caused by a process called "delayed implantation." Following mating in summer, the fertilized egg develops for approximately 15 days. Further development is then temporarily arrested and the egg waits in the uterus in a quiescent state until spring, when it implants

Leonard Lee Rue, III

***The adult least weasel** is the world's smallest carnivorous mammal.*

in the uterine wall and resumes development. The young are born blind and helpless, but they develop rapidly and, depending on the species, become self-sufficient at about three months.

For all their ferocity, weasels are not large animals. Least weasels measure less than 150 mm (about 6 inches) from their nose to the tip of their tail. Long-tailed weasels grow up to 350 mm in length (about 14 inches) and short-tailed weasels are intermediary between the two. Female weasels are consistently smaller than males and some researchers believe this has evolutionary significance. Being polygamous, large males could fertilize many females, while small females, having less energy requirements, could transfer more of the energy they consume to their young. Theoretically, at least, small females and large males could produce more offspring than large females and small males. If all this sounds complicated, it's not. Basically, evolution operates on the premise that genetically superior characteristics allow an animal to produce more offspring than individuals lacking those superior traits. Over countless generations then, the number of organisms having superior traits will increase, until most of the population exhibits them.

In summer, weasels wear a brown coat with white underparts. The shortening length of days in the fall, however, triggers changes in the weasel's pituitary gland and causes a molt. In northern latitudes, this results in a white, winter coat called "ermine." Ermine pelts from long-tailed and short-tailed weasels were once highly sought by the fur trade, but the pelt from the least weasel has never had much commercial value. Ermine is still used, however, and between 1970 and 1976, the annual number of pelts sold in the United States and Canada ranged between 43,876 and 102,090. Ermine was also a valued commodity long before white man set foot on the shores of North America. In medieval Europe, it was worn solely by royalty, and even American Indians believed great wealth and power were imparted to the wearer of one of these pelts.

Weasels have slender, almost tubular bodies, which allow them to enter the burrows of their prey. This functional body is not without disadvantages, however, for it is a very poor design for conserving body heat. Being a warm-blooded animal, the weasel must maintain its body temperature within a narrow range. When the surrounding air is colder than the weasel, heat is generated by metabolism to counteract the heat lost to the environment. Because a sphere has the lowest ratio of surface area to volume, the more closely an animal's body approximates a sphere, the better its ability to maintain body heat in cold weather. That's little help or consolation for a lanky weasel, however, and consequently heat loss is considerable. Scientific studies have found weasels lose almost twice as much heat to the environment as comparably sized wood rats. The weasel compensates for this heat loss by "stoking up" its internal furnace, but because it has a very small gut, it has to make an almost continual shuttle out to the "wood pile" for food. Food is so critical, in fact, that it has been said weasels live their lives "on the edge" every day.

Fortunately, nature has not left the weasel without resources to deal with this difficulty. Few animals are better adapted to their predatory role. Weasels hunt in a highly effective, random search pattern, probing burrows and snatching furtive glimpses of their surroundings while standing on hind legs. Sight, sound, and odor are possible cues used to locate prey; however, there is some evidence that they depend mostly on sight. Laboratory studies have documented weasels passing within a few centimeters of motionless mice, seemingly unaware of their presence.

When a weasel detects its prey, it becomes instantly alert and focuses all of its energies towards making the kill. This is an advantageous behavior for an animal whose survival is often measured in hours between meals, but it has led to a less than desirable reputation. Weasels rarely encounter more than one prey animal at a time, but when they do instinct dictates that they kill as much as possible regardless of whether the creatures killed can be eaten immediately. When such "bonanzas" occur, the weasel usually caches its prey to be eaten later. Few of us would argue this strategy, but when the weasel slips into a chicken coop, it is small consolation knowing the animal is simply following instinct.

Weasels kill by biting their prey in the neck or at the base of the skull. The initial bite is often used to obtain a hold on the prey. The weasel then wraps its body around the prey, gaining further leverage for the neck bite. Specialized canine teeth and knife-edged molars puncture and slice through muscle tissue, resulting in quick kills.

As yet, North American weasels are not considered threatened, although the same cannot be said for some of its close western relatives. The black-footed ferret, for example, is endangered and may exist in only a few small colonies. The outlook for the black-footed ferret is bleak.

In North Carolina, while few of us will know the thrill of seeing a weasel, it is at least comforting to know that these small, ferocious mammals are fairly common. Meanwhile, scientists continue to study their habits and special needs, and someday we may know a great deal more about these mysterious creatures.

I recall reading about one man who spent a lonely winter in a cabin and claimed to owe his sanity to a weasel. Trapped by heavy snows and beset by rampant cabin fever, he later noted that the high point of each day came after dark when a weasel slipped through a crack somewhere in the cabin and hunted for prey in the woodpile and along the dark corners of the cabin. It must have been a fascinating nightly vigil to wait for the appearance of that weasel and watch it hunt. Of course, there was no way to change the "channel" and get another program, but who would want to?⊠

# *Training Our* WILDLIFE ENFORCEMENT OFFICERS

Mike Zeiss

***Surveillance is one** of the techniques that wildlife enforcement officers learn at basic training school and close teamwork is possible through the use of a sophisticated statewide radio network.*

## The N.C. Wildlife Resources Commission's 213 enforcement officers know what to do when the chips are down.

by Terry Shankle

The telephone rang just as the rookie wildlife officer's head hit the pillow. It was midnight. The caller spoke quietly, as if not to be heard by someone nearby. "There's a couple of boys heading for the old Smith place to do some spotlighting. They'll be there in about 30 minutes."

As the officer hurried to dress, his mind was racing. He was the lone officer working that night in his three-county work area. He knew any help summoned would be late arriving and not familiar with the area. He could get help from the Sheriff's Department or Highway Patrol but knew that although eager to assist a fellow law officer, those officers were not trained to work spotlighting. Besides, they might be busy with their own work. And finally, he thought, this report might not pan out.

He headed out into the cool February night. The old Smith place was remote, but because the old farm had always been a favorite spotlighting area, he knew it well. He would hide his car in a recently logged area across from a wheat field. Using his two-way radio and the Wildlife Commission's Raleigh Base Station Telecommunicator, he attempted to notify a wildlife officer in an adjoining county and have him enroute to the area. As his patrol car cut through the patches of fog that had settled in the low places, he spotted numerous deer along the roadside and adjacent fields. Several times he swerved or nearly had to stop to avoid them as the animals criss-crossed the narrow, paved rural road. He finally reached his setup and cut his headlights. The wildlife

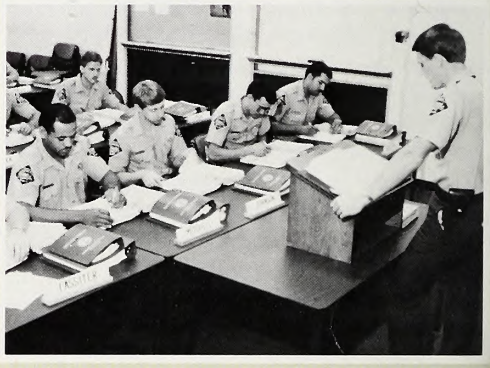
Jane Rohling

**Major Ray Johnson**, *who is in charge of the wildlife officer basic training school, reviews the schedule with coordinator, Janice Smith, at the Institute of Government training center at Chapel Hill.*

Ken Taylor

***Extensive training*** *in the use of firearms is an important part of the schedule during the lengthy series of courses taught at the wildlife officer basic school.*

Ken Taylor



Ken Taylor

***Wildlife officer recruits*** *must have a thorough understanding of all wildlife, hunting and fishing laws, and extensive classroom instruction is part of training.*

***A wildlife enforcement officer's*** *job doesn't end with the safe apprehension of suspected violators. To be truly effective, an officer must know how to properly and fairly present evidence in court.*

officer in the adjoining county radioed him that he was involved in a similar detail 30 miles away. He would be unable to help.

The radio went silent, and the officer rolled down the window for some fresh air. As his eyes adjusted to the darkness, a great horned owl hooted in the distance. He was alone. He thought about what might happen. He might see nothing. He could catch the spotlighters without incident. He could be involved in a high-speed chase, perhaps a wreck. He could be injured. He could be shot at. He could be killed.

As the minutes passed, the ticking of the clock seemed to get louder and louder. A garbled transmission on the two-way radio, which seemed faint minutes before, startled him. To pass the time, he checked his flashlight, his revolver, and refocused his binoculars on a distant light. He thought about why he had wanted to become a wildlife officer in the first place. He remembered the tedious selection process he'd been through. How proud he'd been the first time he wore his uniform. The hundreds of hours of training he'd taken to be prepared for just the situation he was in now.

He was confident that the training he'd received was the best possible. Training specially tailored to suit the vast array of problems that confront wildlife officers in this state. He'd used some of that training already tonight and would probably use more before he returned home.

A fictitious incident, perhaps, but by no means uncommon. Wildlife enforcement officers are involved in hundreds of similar cases each year as they enforce the game, fish, and boating laws across the state. "Our officers handle these incidents well because they are as well trained as any in the United States," says Major S. R. Johnson of the N.C. Wildlife Resources Commission's Division of Enforcement.

As the head of training for this state's 213 wildlife officers, Johnson speaks from experience. He has been responsible for developing their training from a bare-bones recruit school that only taught prospective officers the basic laws and their enforcement, to the finely tuned training program of today.

"In 1973, training for all types of law enforcement began changing in North Carolina because the N.C. Department of Justice established what's now called the Criminal Justice Standards Division," says Johnson. "They set up minimum standards that all enforcement officers statewide must meet during their first year of work. In 1973 it was 160 hours of training. In the late '70s it jumped to 240 hours. In 1985, it was increased to 369 hours, but the big change was that 113 hours of that training must be done before employment, where before all training could be done after employment.

"Of course our officers were getting more training than that to begin with," Johnson continued. "So those requirements weren't hard to meet. A problem with the rules was that the Criminal Justice Standards Division made no provisions for the specialized training needed by agencies that did specialized types of law enforcement work such as the Wildlife Commission or Division of Marine Fisheries.

Today, instructors don't waste time teaching subjects that wildlife officers aren't involved with, such as investigating motor vehicle accidents and traffic-control problems. They can now cover subjects unique to wildlife enforcement, a job that has changed tremendously in its demands over the last 30 years.

**"New officers attend a training school over 12 weeks each summer, and the instructors are veteran wildlife enforcement officers who are experts in various aspects of wildlife work."**

New officers now attend a 525-hour school over 12 weeks each summer at the Institute of Government in Chapel Hill. The instructors are veteran officers who have become expert in various aspects of wildlife work and who also have the ability to teach their skills to others.

"Of course we train our officers in the basic law-enforcement skills such as pursuit driving, defensive tactics, laws of arrest, laws of search, firearms, and how to prepare for court," says Johnson. "But we also train in very specialized areas, such as how to deal with problem animals, identifying waterfowl, fish and other animals, investigating motorboat accidents, maintaining motorboats, knotsmanship, water safety and swimming, boat trailering and handling, hunter safety, dealing with the media, and stress control. Our officers are also taught that their job is not just writing tickets. They should become active in community and civic affairs so that people realize that wildlife officers are a benefit in any area where they're stationed."

Johnson feels that training is improving the way North Carolinians perceive wildlife officers. "Each year we get an increasing number of compliments from the public about how well our officers are trained. It makes me proud to have had some influence on their training."

Becoming a wildlife officer is a popular goal. Each year between 800 to 1,000 people apply for acceptance to the Wildlife Enforcement Officer Basic Training School. Usually between 15 and 20 new officers are needed each year to fill vacancies so the Wildlife Commission can be selective in the people it chooses for the school.

A prospective wildlife enforcement officer must be 21 years old, a high school graduate, a resident of North Carolina, have no criminal record, be in excellent physical health, and be willing to relocate anywhere in the state.

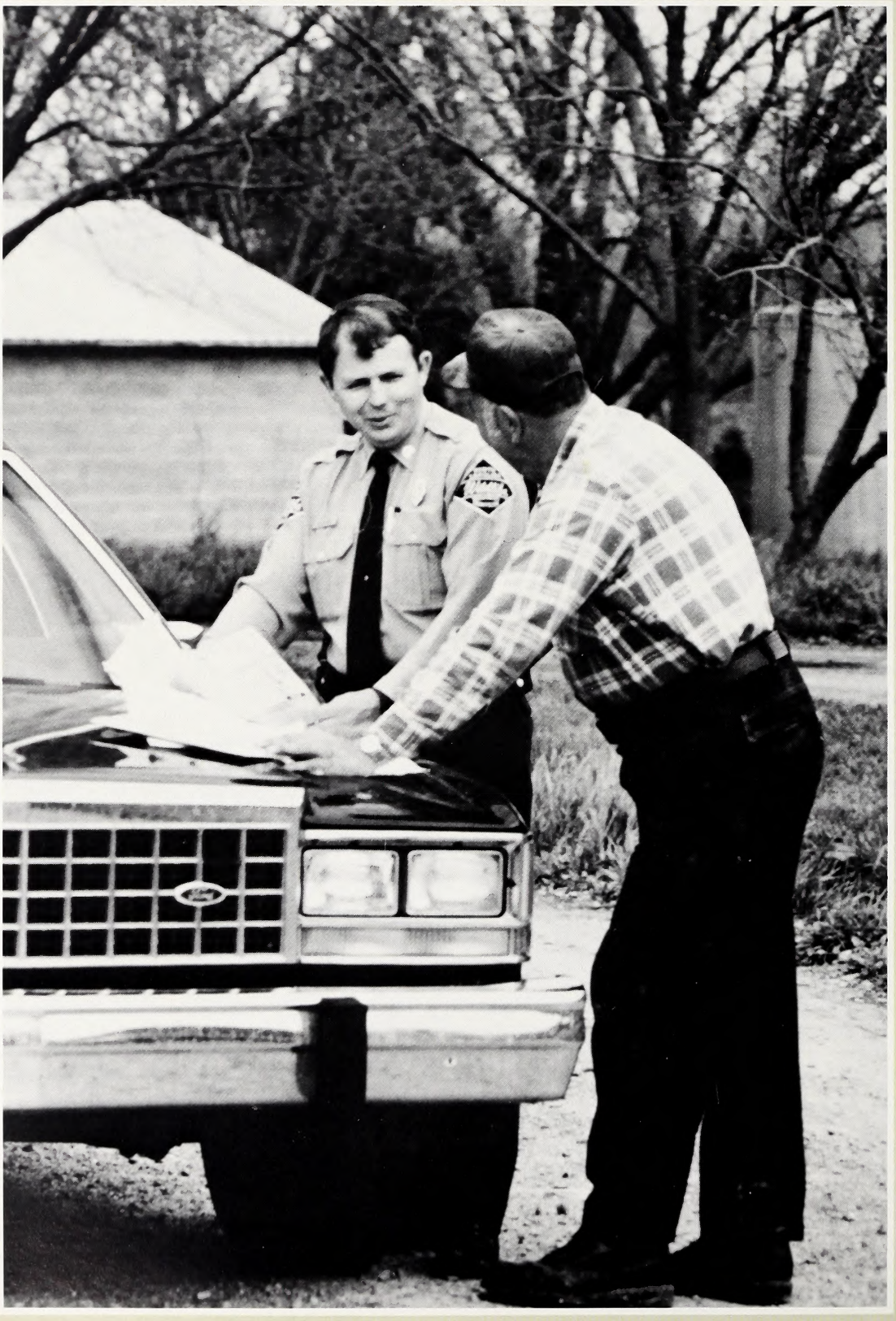
The Commission is an equal-opportunity employer, with women, blacks, and Native Americans represented in the ranks of the enforcement division. Applications can be obtained from any N.C. Employment Security Commission office. That's the office where each applicant must also take a basic aptitude test, the results of which are sent to the Wildlife Commission. Many applicants are quickly determined ineligible because they don't meet the minimum requirements or because they do poorly on the test.

In preparation for each Wildlife Basic School, approximately 140 applicants from the original 800 to 1,000 are invited to Chapel Hill for a day of testing on their wildlife skills, strength and agility. Approximately 30 survive the next round of cuts and have a complete background study done including computer checks through FBI files. Between 15 to 20 applicants are then called back to Chapel Hill for in-depth interviews by veteran wildlife officers. From that group, a basic school is chosen and because the selection process is so thorough, the attrition rate is very high.

"For people who meet the requirements, enjoy work that is sometimes dangerous but always interesting, and like to work with all types of people in the outdoors, this is the job to strive for," says Ray Johnson.

He should know. He's been enjoying the job for over 32 years.

Ken Taylor



***To be effective**, a wildlife officer must have a good, friendly working relationship with landowners and other law-abiding citizens who can help him carry out his wide range of responsibilities.*

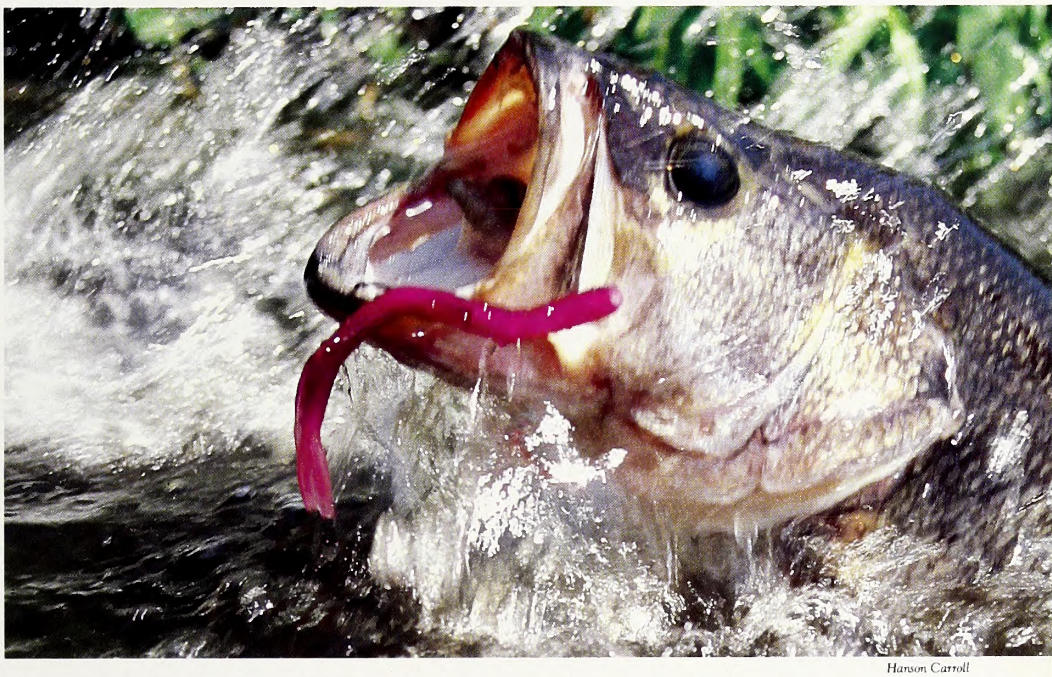
NORTH CAROLINA Wildlife RESOURCES COMMISSION

North Carolina
Wildlife Resources Commission
512 N. Salisbury Street
Raleigh, NC 27611

# PLASTIC WORMS REVISITED

***Some fishermen don't like to use 'em, but a properly fished plastic worm is the most effective artificial lure for largemouth bass.***

*by Jim Dean*



Hanson Carroll

***Soft plastic lures** like this worm have become a favorite of bass fishermen.*

When the first plastic worms hit the market in the 1950s, they were considered little more than curiosities. There were two types, as I recall. You could get imitation red wigglers that were supposed to replace the real thing. Just thread them on the hook under a cork and sit back and wait for a bite. Anybody who believed that would work is no doubt still waiting for that first nibble.

The second type had more promise. Most were 6- to 8-inch black or red worms rigged on a monofilament harness with two or three hooks with wire weed guards implanted into the worm. A small spinner and a few beads were frequently strung on a monofilament leader just ahead of the worm. (By the way, you can still buy virtually the same worm today, but few fishermen use it.)

Unweighted, these rigged worms were an abomination to throw with a baitcasting outfit, but they had enough weight for long casts on the relatively new spinning reels, and that's the way most of us fished them.

Looking back, I suspect we made every mistake in the book. We used 6-pound test line and spineless solid glass rods that couldn't drive a hook into a gumdrop, much less the bony mouth of a bass. To get more weight, we pinched split shot on our lines, and of course that's where the line always broke. We rigged the worms so they would twirl and wound up with the most awful tangles you've ever seen. We used swivels to overcome the twist, and they either didn't work or destroyed the action of the lure.

But that wasn't the worst. When we did get a bite, we'd let our unseen bass run with the worm for what seemed like hours (and miles) before we figured it was time to set the hook. I've had bass jump 100 feet behind the boat without realizing at first that the leaping largemouth was the same one on my line. Of course, the line was still wrapped around half a dozen stumps in front of the boat.

It's a wonder we ever landed anything, but it's no secret why we kept trying. Those strange, sticky worms attracted attention. I remember the first time my grandfather and I used plastic worms in the old millpond we always fished. We had more strikes than we'd normally have in an entire season, and although most got away, we had some awesome bass chewing on those worms.

The techniques for fishing plastic worms matured quickly, however, and by the late 1960s, expert worm fishermen had pretty much worked out the kinks. Indeed, except for improvements in tackle, basic worm-fishing techniques have not changed much in the last decade. Most fishermen are probing shorelines and deep dropoffs and other structure with weighted worms fished on stiff casting rods and freespool reels filled with fairly heavy line.

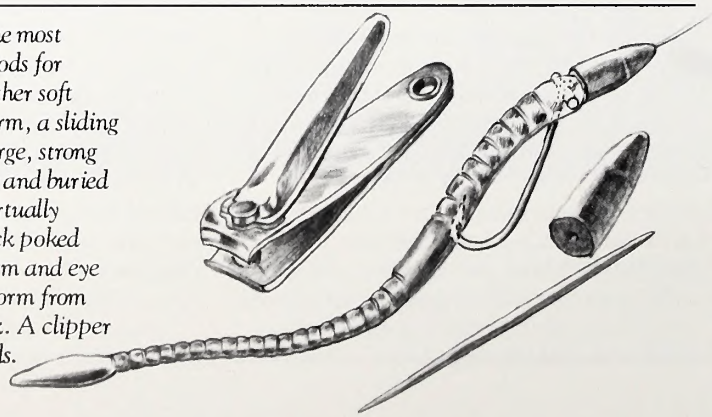
If you're still one of the stubborn holdouts who never got around to trying worms, it's time you did. It may not be as much fun as watching a bass hit a topwater lure, but it's not exactly "work" either. Here, as briefly as possible, are the main things you'll need to know.

First, you need the proper tackle. Most worm fishermen use fairly stiff casting or spinning rods — wimpy rods won't set the hook. Also, it takes fairly stout monofilament line to properly set a hook, and since you're often fishing around brush or other cover, the strong line will help you control a sizeable fish. Most worm fishermen use 17- to 30-pound test monofilament on their baitcasting outfits, and not less than about 12 or 14 on spinning outfits. Tackle properly rigged for worm fishing may be a bit heavy to double effectively for all types of lure fishing, but it's certainly easier to cast lures on worm tackle than it is to convert a light plugging rod and 8-pound test line to worm duty.

There are several ways to rig a worm, but one technique has stood the test of time,

***Weedless, weighted soft plastic worms*** *can be fished in tree laps and weedbeds where the big ones are hiding.*

***The Texas Rig*** *is one of the most popular and effective methods for rigging a plastic worm or other soft plastic bait. You need a worm, a sliding lead weight, and a fairly large, strong hook with the point turned and buried into the worm to make it virtually weedless. A round toothpick poked through the head of the worm and eye of the hook will keep the worm from sliding down the hookshank. A clipper snips off the protruding ends.*



and in the interest of space and simplicity, let's stick to it. It's called the Texas Worm Rig (see illustration), and it works with worms of most any size. The first step is to thread a conical sliding weight on your line, and tie the line to the hook. Then, run the point of the hook straight into the tip of the worm's head somewhere between ¼ and ½ inch deep, push the point back out of the worm, and turn the hook so that the point faces the worm. Next, slide the hook through the worm until the eye of the hook and knot is buried in the head of the worm.

Hanson Carroll

To keep the worm from sliding back down the hook shank, many fishermen push the point of a round toothpick through the head of the worm and the eye of the hook and clip off the ends flush with the worm using a toenail clipper. Finally, you bury the point of the hook into the body of the worm just past the barb to make the rig virtually weedless. The worm should be essentially straight when you pull it through the water, otherwise you'll twist your line when you retrieve it.

There seems to be no end to the many types of soft plastic worms and other critters you can rig in this fashion, but most bass fishermen favor a 6- to 8-inch worm with either a straight or curled tail. The curly tails are newer and impart a bit more action. Though many fishermen use 6-inch worms, I prefer an 8- or 9-inch worm because I hook fewer small bass or panfish. You'll get some differing opinions on this, of course, so you'll probably want to experiment to see what suits you best.

Worm color is also partly a matter of personal choice, but my own favorites in descending order are purple, black, blue, light green, translucent amber and variations of these with brightly colored contrasting tail colors. Some fishermen swear by the greenish motor oil flavored worm, and most soft plastic baits are now flavored in some way. Some are also impregnated with one of the new fish attractants.

Choosing the right hook size is important, and the tendency among newcomers is to use too small a hook. With an 8- or 9-inch worm, a 5/0 hook is commonly used, and I prefer a 3/0 hook with 6-inch worms even though some fishermen use 2/0. Sliding conical sinkers come in a variety of weights, but unless you're fishing in fairly deep water — 15 feet or more — I'd pick the lightest weight that's heavy enough to cast easily. Rarely will you need more than ½ ounce, and lighter weights are usually more than adequate.

When fishing shallow water, some fishermen use no weight at all other than the hook and worm. Various types of floating worms have also enjoyed success. Using the same Texas Worm Rig, anglers have used syringes to inject air into the worms so that they tend to suspend off the bottom. This works best if you use a 2-foot leader ahead of the worm tied to a small swivel, and thread the weight on the line in front of the swivel so that it cannot slip down against the worm. Over the years, a few fishermen have also experimented with unweighted floating worms fished on the surface, and this technique may enjoy renewed interest with the recent development of a commercial floating worm head now available at tackle shops and mail order tackle businesses.

A brief mention of tactics is in order. Since worms are practically weedless, you can fish them in a wide variety of spots. Tossed into tree laps, weed beds and stumps along a shoreline, they can be deadly. Fished deep around dropoffs, points, creek channels, submerged roadbeds, bridge pilings and other structure, they are probably unbeatable, although a depthfinder is certainly an asset in finding such underwater bass cover.

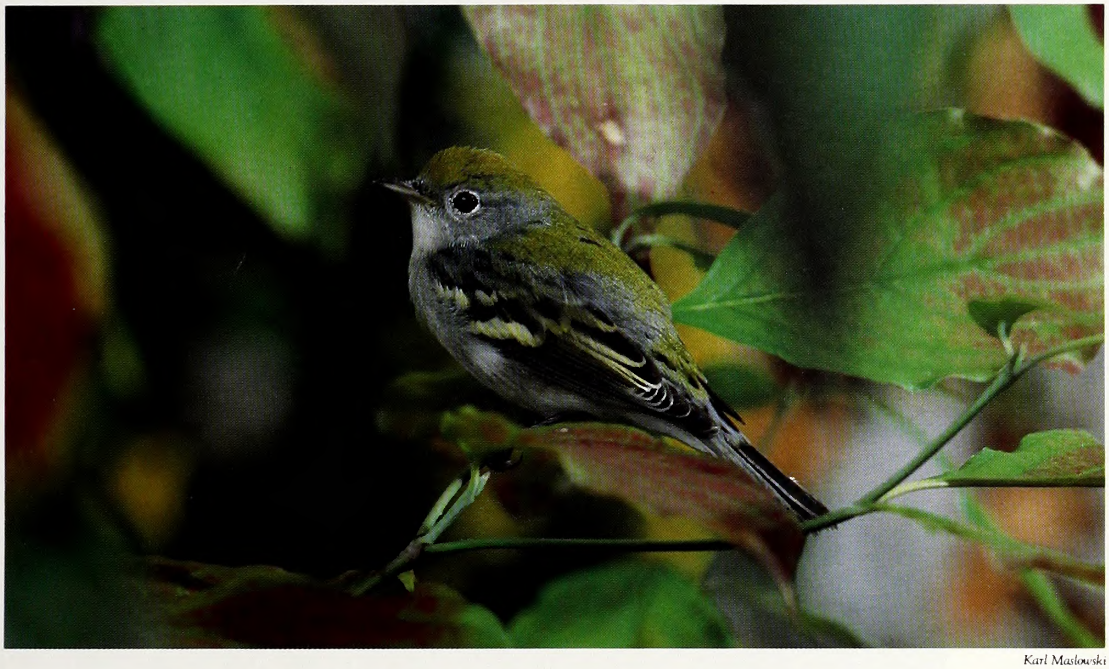
It usually takes a bit of experience for the first-time worm fisherman to learn to hook and land fish regularly, but the basic steps are not complicated. After you've made your cast, the retrieve is usually made with the rod rather than by reeling. That is, you try to "work" the worm seductively along the bottom by raising the rod tip in a series of twitches until it's vertical. Then, drop the tip and quickly take up the slack before again working the worm towards you by raising the rod tip. If you feel a strike or encounter suspicious resistance, instantly drop the rod tip to give the fish slack so that he won't feel anything to spook him. Some fishermen freespool the reel or open the spinning bail and feed out a bit of slack line to give the bass time to get the worm into his mouth.

You'll get some argument about how long to let a bass chew the bait, but most skilled fishermen have abandoned the old system of letting the fish run with the worm for several minutes before setting the hook. Doing that often invites tangles and lost fish. Some fishermen merely drop the rod tip, count to three, lean forward and tighten the line, then set the hook hard. Others wait a bit longer until the line begins to move — letting the bass take up the slack line before setting the hook. When you set the hook fairly quickly, you are less likely to gut hook and kill small bass you might want to release, and most larger bass will have already gulped the worm in the first 5 seconds anyway.

There's no argument, however, on setting the hook. You've got to take up the slack so that you've got a direct pull when you set the hook, and you've got to set it with gusto to drive the point through the worm and into the bony mouth. Also, the reel drag must be set fairly tight — a couple of pounds below the breaking point — or you'll rarely get a solid hookup. If you hook a big fish in heavy cover, you've got to horse him out of there pretty quickly or lose him, and it's no place for a soft rod, light line or delicate touch. You can play him when you get him in open water, although even then it's risky to let a good fish have the slightest slack line.

Confidence is one of the keys to success in bass fishing, and it's one of the hardest things to obtain when you're trying a new tactic. I know lots of fishermen who have tossed a worm a time or two then switched back to an old favorite lure. However, give worm fishing a truly fair trial, and you'll soon learn to trust the technique. It really works, and while it may not match topwater plugging for excitement, it has its moments.

When you feel that "tap, tap, tap" on the line, and watch the monofilament straighten as your fish bolts your worm and slowly moves away, you never know for sure whether it's a 9 incher or a 9 pounder. I guarantee you this — your mind won't be wandering. ☒



Karl Maslowski

***Changing land use** has made the chestnut-sided warbler more abundant today.*

# Warblers Are Where You Find Them

## At least 40 species of warblers visit or nest in North Carolina, and you can find them if you know their habitats.

by David Lee, Curator of Birds
N.C. State Museum of Natural History

***The yellow-breasted chat** is the largest of our warblers. Like many species it is a bird of hedgerows, woodland edges and early-growth thickets. Its harsh mimicking voice is distinctive and loud, revealing the presence of an otherwise secretive bird.*

You can tell a blue bird from a blue jay, a cardinal from a summer tanager. The difference between a purple finch and a house sparrow is as clear as night and day. You're after some bigger challenges now. Like warblers.

Don't laugh. Sure, there are plenty of them in North Carolina — at least 40 species have been recorded around the state. They are also among the hardest to find and to identify. They are all the same size, and they offer a confusing array of colors and share similar field marks and songs.

But even beginning bird watchers can improve their warbler-spotting skills by applying a few ecological principles. And this is the time of year to try it. For one thing, the confusing and often similarly marked migrant species have departed, leaving 25 species behind that will nest here. That cuts the odds considerably. For another, during the nesting season, the summer birds settle into a daily routine. Tied to the chores of raising young, these diminutive birds stay put, making them easier to study.

Warbler watching is even easier once you realize that the vegetation you're looking in, and the geography and climate are important clues to the kind of warbler you're likely to find. Many warblers are absolutely restricted to particular stages of vegetative succession — the natural and gradual development of complex communities, such as forest, from simple earlier stages of fields and meadows.

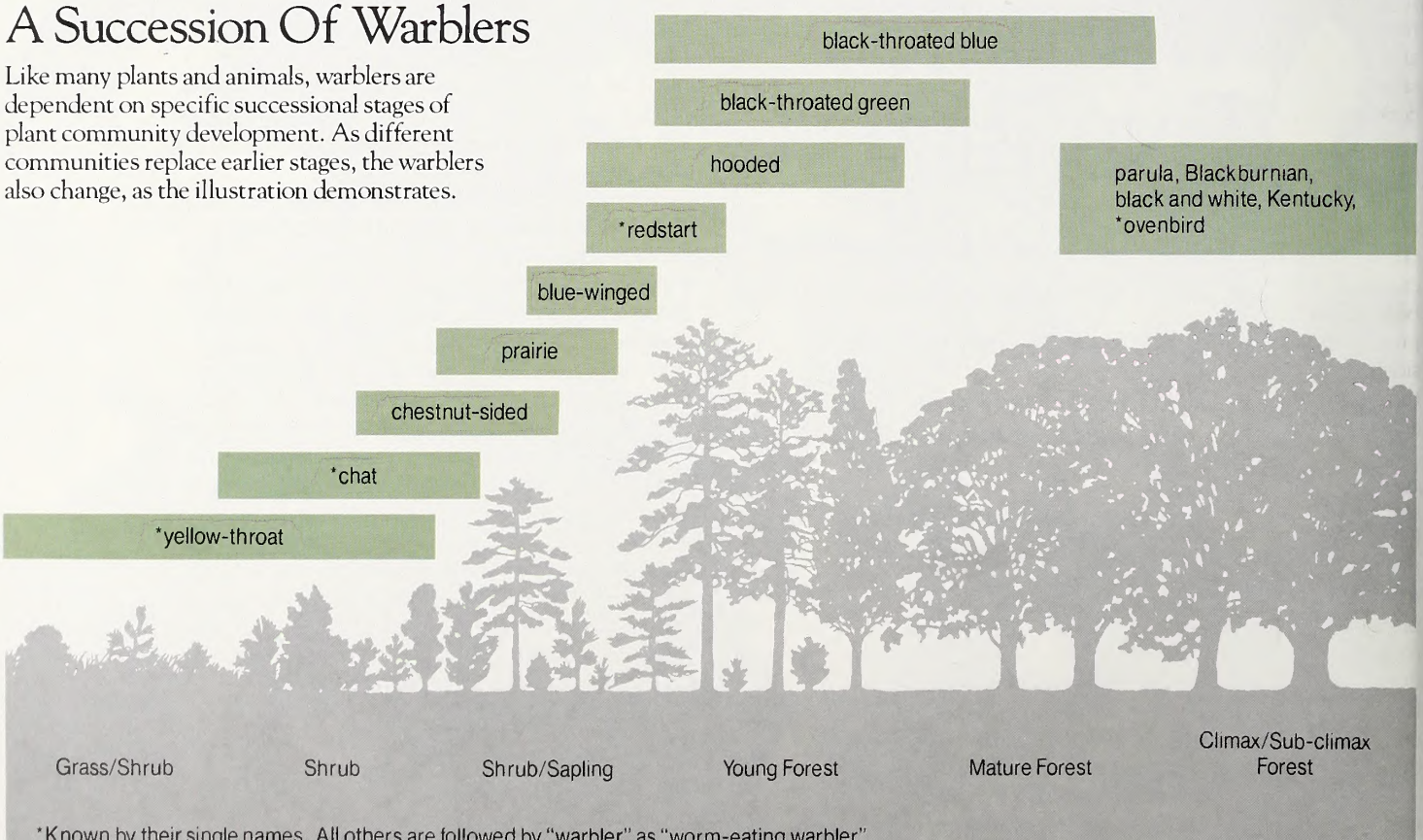
Take the example of the chestnut-sided warbler. Throughout the period when John James Audubon was working on the now classic *Birds of America*, this warbler was a rare bird. During Audubon's extensive travels between 1820 and 1844 he encountered only five individuals. Yet today this

***Kentucky warblers*** *are normally confined to mature woodlands where they inhabit dense understories. Although they are found throughout much of the state, they are absent from high elevations as well as the more eastern portion of the Coastal Plain. These are one of the few warblers that nest on the ground.*

Karl Maslowski

# A Succession Of Warblers

Like many plants and animals, warblers are dependent on specific successional stages of plant community development. As different communities replace earlier stages, the warblers also change, as the illustration demonstrates.




*Known by their single names. All others are followed by "warbler," as "worm-eating warbler."

species is quite common, nesting regularly in the mountains of the southeastern United States where Audubon did much of his work. The bird's abundance today is mainly a result of man-made changes in habitat. Chestnut-sided warblers require forest edges and very young secondary forest growth, habitat in short supply in Audubon's day. But as loggers removed most of the original timber from the Southern Appalachians in the late 1800s and early 20th century, this primarily northern bird expanded its range into vast areas of southern real estate that were previously unavailable.

Currently these warblers prosper in our mountains, mostly on highway and utility rights-of-way. Here, road crews mowing and pruning back the vegetation maintain the early successional stages the bird needs. Clear-cuts and similar lumbering practices also make available large blocks of early-growth woodlands, further adding to the local success of this and several other species of warblers.

As the trees mature on different sites some warbler species will abandon a site while others will move in. For example, in thickets which only years before were abandoned fields we find yellow-throats, yellow-breasted chats, and in our mountains, chestnut- sided warblers. Once the young trees outgrow the sapling stage, species such as the hooded warbler take up residence. By the time even a modest forest canopy develops five or six additional species move in, while those associated with prior stages of forest development normally disappear. In mature woodlands forest-interior species such as Kentucky warblers reach their greatest abundance. In general, however, warblers are not typical residents of well-developed climax or virgin forests, and when found there they are generally present in small numbers confined to the edges of these communities.

This successsive colonization is exactly what happened in earlier times but with modern land-use practices today, it's often on a larger scale. As a result, many warbler populations associated with cut-over woodlands have grown and spread. As expected, not all wildlife, or even all warblers, benefit from these man-made edges and artificially produced age classes of forest. While chestnut-sided warblers increase, other warblers disappear — those that require mature forest in which to nest and raise their young.

Of course warblers of early successional communities are not confined simply to habitats artificially disturbed by man. The best warbler habitat I know is the pocosins of our state's coastal plain. The water-saturated, black, peat soil prevents root systems from getting much oxygen, leaving plants in a perpetual shrub stage. Even though their roots are wet, the accumulation of thick, dead and dying woody stems makes pocosins susceptible to fire. The saturated soil and natural fires maintain entire plant communities (which consist of only 15 or so key species) in the shrub stages.

In all, I have found 15 species of nesting warblers in Bladen County pocosin communities, with several, such as the worm-eating warbler, considerably south and east of their previously known breeding areas. Within a particular pocosin, however, the stunted woodland may be so uniform that it is perfect habitat for only a few species, with most others excluded. Along a back road bordered on both sides by low shrub pocosin I counted 70 territorial male yellow-throats in a distance of a quarter mile, yet no other warblers were seen. In mature Carolina bays that had not burned for over 40 years, however, the warblers are quite varied, and even species such as Swainson's warbler, a bird considered rare by even the most avid bird watchers, can be quite common.

Steve Maslowski

***The prairie warbler** inhabits dense shrubs and saplings, but it is so curious that it can be teased into view by unusual sounds. Its song is more distinctive than the bird, a characteristic common to many of our woodland warblers. The warbler's quick trill ascends the musical scale, hitting each consecutive note.*

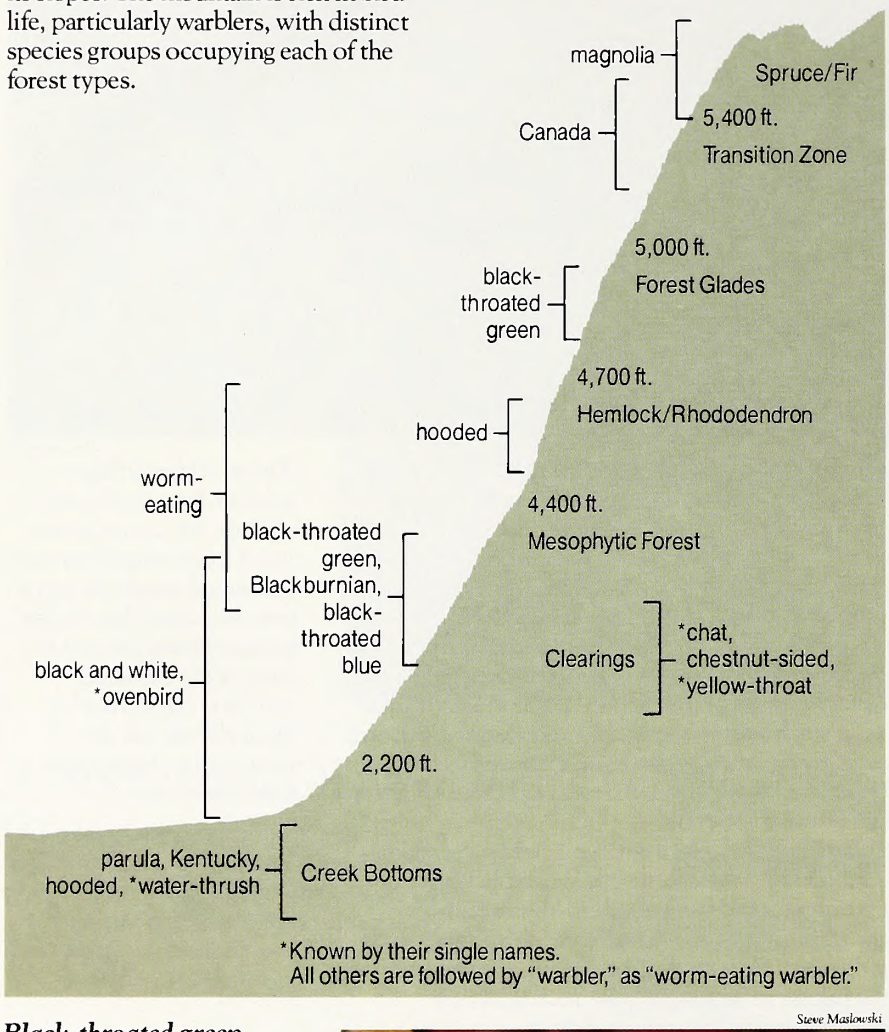
Another example of a natural early successional community is the wax myrtle shrub thickets of our barrier islands. Here the yellow-throat is also a conspicuous resident, but the shrub's growth form is different from those growing in pocosins, making the habitat more favorable for nesting prairie warblers and yellow-breasted chats.

On a broader scale than local succession, geography and climate also influence where warblers may be found. While some of the warblers found in North Carolina are distributed throughout the eastern United States, others are geographically restricted to defined areas because of ecological needs. Nowhere is this better exemplified than in our mountains where many birds are restricted to habitats at specific elevations.

A visit to Grandfather Mountain provides an excellent lesson in the role elevation plays in the development of plant communities, which in turn provides barriers to local warbler distribution. Grandfather Mountain is a particularly good spot to witness this since it has the most marked elevational variation of any of our mountains and most, if not all, of the warblers found in the southern Appalachians occur here. Over 20 species spend the summer on the mountain, including eight warblers that, in North Carolina, are restricted to the mountains.

# Grandfather Mountain's Warblers

Grandfather Mountain, like many other southern Appalachian mountains, provides a spectrum of habitats along its slopes. The mountain is rich in bird life, particularly warblers, with distinct species groups occupying each of the forest types.




Steve Maslowski

***Black-throated green*** *warblers are distributed primarily throughout the eastern part of the Coastal Plain and in our mountains. Except for a very small population in the Uwharries they are absent from the Piedmont despite ample habitat. Like most of our warblers they winter in the new world tropics.*

Starting near the base of the mountain at 1500-2,000 feet, the warblers and other birds are the same ones generally found throughout the state, but after a climb of only a short distance some species disappear and many others become less common. By the time one climbs above 2,000 feet, Kentucky warblers, parulas, Louisiana waterthrushes and American redstarts can no longer be found, although to the untrained eye the hardwood forest at this elevation does not look much different from that found only a few hundred feet below.

In a half hour walk, at 2,200 to 4,400 feet, new species are encountered mixed among the woodland warblers. From high up in the trees the insect-like songs of the black-throated green and the strikingly colored Blackburnian warbler can be heard, while from the understory come the loud song and occasional glimpse of the black-throated blue warbler. Past the 4,400 foot elevation these species, and what remains of the lowland warblers — the ovenbird and black-and-white warbler for example — all disappear.

Between 4,400 and 4,700 feet is a transition area between the rich lowland hardwood forest below and a forest composed mostly of northern plants restricted to the higher slopes. The habitat is not really suited for warblers from either elevational extreme, but in the dense hemlocks and rhododendron thickets the colorful hooded warbler and the secretive worm-eating warbler can be found. Above 4,700 feet the forest is rich in northern and mountain plants. Extensive forest glades of tall hardwoods intermixed with hemlock and red spruce have little understory, and only the canopy layer provides adequate cover for warblers. In this zone the black-throated green warbler, a species present in small numbers lower down the mountain, persists in incredible numbers. Standing in any spot at this elevation a person may hear 20 or more males singing their characteristic drowsy five- to eight-note song.

Above 5,000 feet the mountain is occupied mostly by warblers of the north woods, although in clearings made by winds and storms persistent early-successional species such as chats, yellow-throats and chestnut-sided warblers reappear. High on the peaks in woodlands composed almost entirely of red spruce, Fraser fir and mountain ash lives the Canada warbler. The males' bright yellow breast and throat is offset by a distinctive "black necklace." Its loud voice and innate curiosity about anyone entering its territory make this bird a conspicuous part of the displaced northern forest.

Along the windy ridge of Grandfather Mountain, 5,400 feet and above, the magnolia warbler has been discovered living on the edges of clearings in the spruce forest. Until recently this species was unknown in the nesting season south of central West Virginia's mountains, and it is not regularly encountered south of upstate New York in the nesting season. During the last decade or so the magnolia warbler has expanded its range into the southern Appalachians, being found on Roan Mountain, Grandfather Mountain and several nearby mountains in southwestern Virginia.

Karl Maslowski

***The colorful hooded** warbler is one of many warbler species found throughout North Carolina. In spite of its striking coloration it is often difficult to find. As with many warblers it selects habitats where dense foliage offers concealment. Its loud, buzzy song is a familiar sound to anyone who spends much time outdoors. This hooded warbler is raising a nestful of cowbird young. This species habitually lays its eggs in warbler nests, leaving the feeding chores to the warblers.*

Another northern species, the yellow-rumped warbler, was seen in the summer for the first time last year in the spruce forest on nearby Mt. Mitchell. Perhaps these northern birds are now simply reinvading habitat they occupied before the extensive logging of the southern Appalachians, the same activity that allowed the chestnut-sided warbler to expand its local population, and probably its distribution.

Although successional stage, land-use practice and geography are all important in determining which groups of warblers live where, most woodlands simultaneously support a modest to often complex diversity of warblers. In my wooded yard outside Raleigh, for instance, I have tallied 10 species in a single nesting season and in one Carolina bay I also found 10 species of warblers. If one sticks to a particular elevation zone on Grandfather Mountain the maximum number of warblers again is about 10, at least for even-age successional stages. Of course at any one of these sites the composition of these 10 species is not the same; 10 just seems to represent the maximum saturation point for warbler diversity. Nearly all these birds are the same size, have similar shaped bills, and all are insect feeders.

How can so many similar species co-exist? The answer is that each species exploits different subsections of a given habitat. (See "Summer Warblers In The Backyard," pp. 2-3.) Even after casual observation of warblers for brief periods one quickly learns that different species live in different layers of the forest. One would no more expect to see an ovenbird at the top of a 100-foot pine than he would a redstart on the ground. Each species stratifies itself into a particular layer of the forest. While there is much overlap between species, seldom can one find more than two or three species in the same layer at any given place. A particular species generally lives in the same layer of the forest whether in Florida or Maine.

So strong are the warblers' instincts for seeking the right successional stage and layer of a woodland, that even in the haste of migration the birds normally sort themselves into the proper habitats and the proper place within these habitats while catching between flight snacks.

So it seems that North Carolina's great diversity of warblers is actually built on a mosaic of several key biological issues. The warblers that North Carolina bird watchers eagerly tally, like other portions of our fauna, are never randomly nor evenly distributed. Instinct directs these birds to specific plant communities of specific ages. Here each species conducts a ritualized life style to help minimize competition in a crowded neighborhood. Those who already are avid bird watchers will perhaps find their hobby more rewarding when seeing what a bird does and where he does it, rather than worrying only about what name goes with each package of feathers. Those of us still confused about which warbler they are seeing at a given moment, normally can eliminate many potential species simply by noting where and how the bird is making its living. ⊠

*Wild Turkey And Canada Geese Featured*

# Sportsman's And Waterfowl Stamp Designs Selected

*Written and Edited by Mark Taylor*

New designs were recently selected for the 1987 North Carolina Sportsman's stamp and 1986 North Carolina Waterfowl Conservation Stamp. Limited-edition art prints of both will be produced.

A wild turkey in snow-covered woodlands will be featured on the 1987 Sportsman's Stamp and art print. Louis Frisino's painting was chosen by a committee of wildlife artists, biologists and sportsmen from a group of finalists that included Durant Ball, Arthur Williams, Jim Killen, and Don Blakney. The stamp will be used as next year's North Carolina Sportsman's hunting and fishing license which will be purchased by approximately 140,000 individuals.

"We were very impressed by the caliber of the entries in this contest, and feel this painting by Louis Frisino will make an exceptionally attractive stamp and art print," said Sid Baynes, contract administrator for the N.C. Wildlife Resources Commission. "The selection committee liked the artist's realism, accuracy and sense of aesthetics. We're sure that sportsmen, wildlife art enthusiasts, stamp collectors, and especially turkey hunters will enjoy this upcoming stamp and print series."

Frisino is from Severn, Maryland. His work was selected for the Maryland Duck Stamp in 1977, and also appeared on the Maryland trout stamp from 1977 through 1979. In 1977 he placed third in the federal duck stamp contest, and second in the National Wild Turkey Federation's stamp contest. In addition, his works have appeared in several books and on the popular Christmas cards issued by the National Wildlife Federation.

The 1987 art print and sportsman's stamp will not be available until next year. However, orders for the 1986 sportsman's stamp print — which features Duane Raver's painting of a largemouth bass hitting a topwater plug — will be taken through June 30.

A painting of a pair of Canada geese by Tom Hirata was selected by the committee as the subject of the 1986 North Carolina Waterfowl Conservation stamp. His painting of a pair of canvasbacks also appeared on the 1985 stamp.

"Tom Hirata is an excellent artist, and this painting of Canada geese represents some of his finest work," said Baynes.

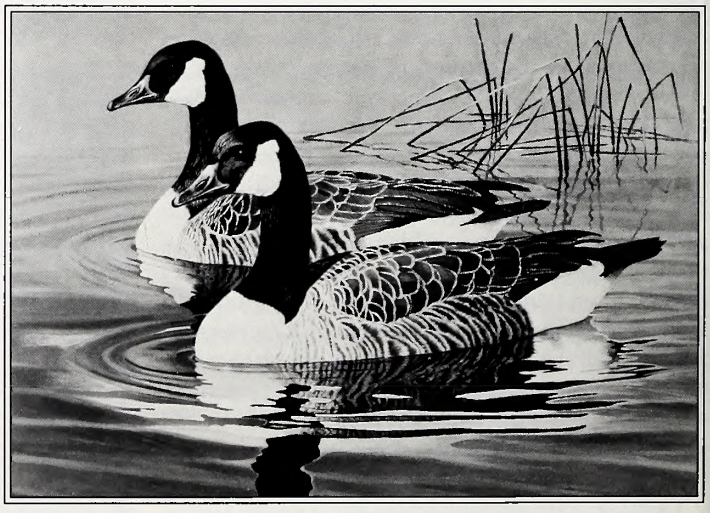
"Hirata is from Rutherford, New Jersey. In 1984, one of his paintings was selected for the First-of-State New Jersey Waterfowl Stamp, and in 1982 he won the Best-of-Show award at the Ducks Unlimited National Wildlife Art Show. He has also been a Gold Room Exhibitor at the Easton Waterfowl Festival at Easton, Maryland.

Funds from the sale of waterfowl stamps and royalties from print sales support waterfowl conservation and management in North Carolina. Some of this money recently helped purchase five tracts of bottomland hardwood forests along the Roanoke River. This swampy forest is excellent habitat for many waterfowl species.

The publishing and marketing of the waterfowl stamp prints is being handled by Sport'en Art-Midwest Marketing of Sullivan, Illinois. Literature on the program will be sent to art dealers in the near future, and dealers will be taking advance orders for prints. While the Wildlife Commission receives a royalty on print sales, it is not directly involved in the retail selling of these prints.

The 1986 North Carolina waterfowl stamps will not be available until after July 1. However, 1985 waterfowl stamps — featuring Hirata's canvasback painting — may be obtained for $5.50 from license agents or the License Section, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.

***King Of The Forest:*** *A wild turkey in winter is a magnificent sight, and this painting by Louis Frisino was recently selected as the design for the 1987 North Carolina Sportsman's stamp and art print.*



***A Study In Grace:*** *This painting of a pair of Canada geese by Tom Hirata was selected as the subject of the 1986 North Carolina Waterfowl Conservation stamp and art print. Funds from this program helped buy several tracts of forest on the Roanoke River that furnish excellent habitat for waterfowl and other wildlife.*

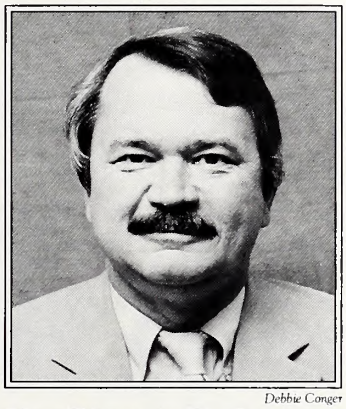
*17 Years Experience With Wildlife Commission*

## Charles Fullwood Appointed Executive Director

Charles R. Fullwood of Raleigh was recently appointed executive director of the N.C. Wildlife Resources Commission by unanimous action of the Commission. He has 17 years of administrative experience with the agency, and has served as acting director since former executive director Vernon Bevill resigned last September.

"Charles has demonstrated that he has the broad base of experience and ability to lend stability to the Wildlife Commission and to take the agency forward in the coming years," said Jerry Wright of Jarvisburg, chairman of the Commission. "In addition, his first-hand knowledge of wildlife issues in North Carolina and familiarity with the agency's operation and staff will contribute greatly to the development and accomplishment of the agency's objectives."

Fullwood is a native of Jacksonville, and earned a degree in government from East Carolina University in 1962. He began his career with the Wildlife Commission in 1969 as an administrative officer. From the fall of 1969 through 1980, he served as chief of the Division of Boating. In this position, he developed the Commission's system of free boating-access areas, safety regulations and a waterway-marking system, and a boating education course for elementary school children. From 1980 to the fall of 1985 he served as director of field operations, which involved the supervision of all of the Commission's divisions and sections.



Debbie Conger

***New Director:*** *Charles Fullwood of Raleigh was recently appointed executive director of the Wildlife Commission. He has 17 years of experience with the agency.*

"I appreciate the confidence the Commission has shown in me, and feel we can effectively resolve the issues facing the Wildlife Commission," said Fullwood. "We have an enthusiastic and supportive Commission, and a hard-working, outstanding staff. We've made a lot of progress in several areas. Maintaining the agency's fiscal integrity is very important, and we're studying our operations and funding sources. We're developing a management plan for Canada geese that will help maintain this important natural resource. We've also expanded youth programs, which will ensure that the next generation shares our appreciation for the outdoors and our concern for wildlife and other natural resources."

*Reports Are Increasingly Common*

## Coyote Found Near Pungo National Wildlife Refuge

Reports of coyotes are becoming more common in North Carolina. One was recently shot in a cow pasture in Hyde County near the Pungo National Wildlife Refuge. The animal was positively identified as a coyote by the N.C. Museum of Natural History.

"The coyote weighed about 35 pounds," said Randy Wilson, furbearer project leader for the N.C. Wildlife Resources Commission. "Judging by its appearances and tooth wear it was a young animal—probably no more than two years old. We've had reports of coyotes from this area for the past few years."

Wilson adds that coyotes in North Carolina are probably released by individuals, and are not the result of an expanding population.

"Over the years the animals have been released by individuals for a number of reasons," he said. "Coyote and fox pups are very hard to tell apart, and some hunters who obtained fox pups from the West were really getting coyotes. Others released them because they'd heard coyotes offered a good chase. Releasing these animals is illegal, and a real mistake. Coyotes are extremely adaptable and clever, and could do substantial damage to deer, small game and livestock if they become established. There's also the risk of importing rabies."

Other coyotes have been taken in Sampson and Wake counties in past years, and there are reports of the animals from Davie and Iredell counties and in the northwestern counties. There are similar reports in South Carolina and Virginia.

## CATCH Teaches Kids To Fish

Does your son or daughter want to learn to fish? Would you like someone to help you teach them? If so, encourage them to join CATCH (Carolina Anglers Teach Children How). It's a youth-fishing program offered by the Wildlife Commission that features how-to-fish clinics.

"CATCH members receive membership cards and patches, a quarterly newsletter featuring CATCH news and fishing tips, and the opportunity to participate in CATCH clinics across the state," said Debbie Paul, chief of the Youth Activities and Environmental Quality Section of the Wildlife Commission. "The clinics are probably the best part. The kids get the opportunity to fish under close adult supervision, and also learn about fisheries management, outdoor ethics and water safety, and conservation. Everybody catches fish, and then they clean and cook their catch."

Fifteen CATCH clinics are scheduled across the state this summer. The schedule is as follows:

- May 3, Wilmington
- May 10, Valdese
- May 10, Fayetteville
- May 17, Asheville
- May 17, Concord
- May 24, Sanford
- May 31, Jefferson
- June 7, Winton
- June 14, Greenville
- June 21, Burlington
- June 24, Raleigh
- June 28, Rocky Mount
- July 12, Winston-Salem
- July 19, Jackson County
- August 30, Currituck County

CATCH is open to all youths from ages 8-15. For membership applications write CATCH, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.

*Proper Equipment Is Essential*

## Preparation The Key To Safe Boating

Are you getting ready for a day on the water? Be sure your boat is properly equipped before you leave the dock.

"Having the right equipment on a boat can make the difference between a fine day on the water and a major headache if a mishap occurs," said Colonel Winfield Rhyne, chief of the Division of Enforcement of the N.C. Wildlife Resources Commission. "And be sure this gear is working properly before you're on the water. It's not much trouble to do this beforehand. However, when you need something—such as a fire extinguisher—you need it quick, and it better be working."

Personal flotation devices, commonly called "life jackets," are required on all motorboats. There must be one PFD per passenger and operator. Water skiers are also required to wear a PFD (flotation belts don't qualify.) On boats of 16 feet and over, at least one throwable device such as a life ring or seat cushion is also required.

"Boaters should check their PFDs before the season begins to be sure they are still in good condition and work properly," said Rhyne. "When you go on an outing, be sure that each person tries on a PFD to be sure it fits. Then, store it close at hand. Children and non-swimmers and lone fishermen and boaters should wear a PFD at all times. If the water gets rough, everyone should put on their PFDs immediately."

Fire extinguishers are required on all motorboats of closed construction (closed compartments where portable fuel tanks may be stored, prermanent fuel tanks, closed living spaces or stowage compartments). Even if your boat is of completely open construction, however, it's a good idea to carry a fire extinguisher if it's powered by a motor.

"These extinguishers should also be checked to be sure they are pressurized and working properly," said Rhyne. "Make sure you know where the extinguisher is and that it's easy to reach."

Different types of navigation lights are required depending on the size of the boat. It's important that these lights be working, however, and it's also a good idea to carry a flashlight on board.

"Even if you're in a small boat and have no intention of being out after dark you should carry a flashlight," said Rhyne. "If you have some problems with your boat, or are just late getting back, it's extremely important that other boaters be able to see you. Horns or other audible devices are not required on boats under 16 feet, but again it's a good idea to carry them."

A number of other devices are not required but should be on hand. "An extra paddle, line, anchor and first aid kit should be on board every boat," said Rhyne. "A tool kit should also be on board any motorboat, and it's a good idea to carry a radio if you're going far. Models are available that are tuned to 'all-weather' channels. It's also a good idea to tie a small whistle to each PFD. If a mishap occurs, this can be a great help in locating the victims—especially after dark."

A final item that should be aboard every boat, but is not available from any marina or store, is common sense. "Be careful," concludes Rhyne. "Watch the weather, and watch for other boaters. If you're on big water and it gets a little rough, head for shore before problems occur."

*Triangle Chapter Makes Donation*

## T.U. Boosts Endowment Fund

Debbie Conger

***Investment In The Future:*** *The North Carolina Wildlife Endowment Fund got a big boost recently from the Triangle Flyfisher's Chapter of Trout Unlimited in Raleigh. The organization donated $1,000 to the fund from the proceeds of its annual banquet. "We feel this fund is a great way to support wildlife conservation in our state," said Jim Little of Raleigh, president of the Chapter. From left to right are Jim Little, Jerry Wright, chairman of the N.C. Wildlife Resources Commission, and Steve McDonald of Raleigh, a member of the chapter's board of directors.*

*Waterfowl Heritage Focus Of Meeting*

## Currituck Hunt Clubs Featured

The waterfowl heritage of coastal North Carolina and Virginia will be featured at a meeting of the Carolina Decoy Collectors and Carvers Association in Raleigh on Sunday, May 18. The meeting will be held at the Ramada Inn on I-70 near Crabtree Valley Mall.

A buy, sell and swap session of contemporary and antique decoys and other waterfowl memorabilia will be held from 10 a.m. through 12 noon. The afternoon program, which begins at 1 p.m., will feature an illustrated slide show and talk on "Old Decoys and Hunting Clubs of Back Bay and Currituck Sound." This program will be given by Bud Coppedge and Archie Johnson of Virginia, who are well-known carvers and authorities on antique decoys.

"This program is open to the general public, and anyone who is interested in decoys and waterfowling or North Carolina history will enjoy it," said Stuart Critcher of Raleigh, a member of the association and a well-known local carver. "Some excellent decoys will be on display, and the program on Currituck Sound and Back Bay is an excellent introduction to our waterfowling history and coastal heritage."

*Advisory Committee Looks At Options*

## Roanoke Bottomland Program Retained

Current management practices and uses should be retained on four tracts of Roanoke River bottomland hardwood forests in Bertie, Halifax, and Martin counties through June 30, 1987. This was the recommendation of the Roanoke River Management Advisory Committee which recently met in Williamston. As part of this decision, traditional hunting leases on the four tracts, which encompass 5,000 acres, would be honored through that time.

"We felt that it was best to maintain the 'status quo' management of these areas while we developed a new management plan," said District 2 Wildlife Commissioner Woodrow Price of Gloucester, who serves as chairman of the advisory committee. "These areas are the best remaining bottomland hardwood forests in the state, and our number one priority is to develop options that will best protect their natural values and to manage these areas to the benefit of all North Carolinians. We're examining the issues of public access, recreational opportunities for fishing, hunting, and nonconsumptive outdoor sports such as bird-watching and nature study, local needs, and others. All of these will be considered in the development of the new management plan."

Four possible options are being examined by the committee concerning the way hunting would be managed. They include complete closure, public hunting by permit-only, requiring hunters to report to a check station, and open hunting.

The Roanoke River Management Advisory Committee is composed of representatives of the Wildlife Commission, conservation interests, sportsmen's organizations, and area residents.

## Field Notes

Trout Season — Open, see regulations digest for creel and length limits.

Wild Turkey Season — Closes May 10. Bearded birds only with a daily bag limit of 1 and a season and possession limit of 2. Rifles may not be used to hunt wild turkeys. See 1985-86 Regulations Digest for counties with closed seasons, and other details.

## The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

**Status on January 31, 1986**

| | Numbers Sold | Revenue Received |
|---|---|---|
| Lifetime Sportsman's License | 16,085 | $4,855,498.59 |
| Lifetime Hunting License | 132 | 25,789.84 |
| Lifetime Fishing License | 983 | 174,501.00 |
| Lifetime Subscriptions to Wildlife in N.C. | 676 | 80,748.12 |
| Contributions | — | 67,181.94 |
| | Fund Total: | $5,203,719.49 |

## Skiff Plans Available

The Simmons sea-skiff was a common sight in southeastern waters from the early 1950s through the 1970s. These boats were designed and built by T.N. Simmons of Myrtle Grove Sound who closed his shop in 1972. The lap-straked, plywood, V-bottom dories with their distinctive motor wells carried fishermen from the sounds through the breaking inlets as far out as the Gulf Stream. The boats were known for their seaworthiness, speed (about 35 miles per hour with a 25-horsepower outboard), and inexpensive construction (about $400 in the 1960s).

A lot of people miss the sea skiffs, and complete plans are now available for an 18 footer. These plans include complete lines, full-sized stem and plank layouts, offsets, step-by-step building directions, and photos of construction details. The package is available for $30 from the New Hanover County Museum Foundation, 814 Market St., Wilmington, NC 28401. Proceeds will be used to expand the museum's collection, including gathering material on this traditional boat.

## Speakers Talk About Wildlife

Are you looking for a wildlife program for your school or civic club? The N.C. Wildlife Federation can help. This conservation organization recently established a speaker's bureau to give programs on wildlife conservation and other natural-resource topics.

More information is available from the N.C. Wildlife Federation, P.O. Box 10626, Raleigh, NC 27605.

*Still Time For '86 Print*

## Sportsman's Print Features Bass

***Catch Of A Lifetime:*** *Wildlife artist Duane Raver captured a moment every fisherman dreams of—a big largemouth hitting a surface plug—on the 1986 North Carolina Sportsman's stamp.*

*Orders for limited-edition, art prints of this stamp will be taken through June 30, 1986. For more information, write PRINTS, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.*

*Print prices range from $90.00 to $125.00 and stamp prices range from $7.50 to $9.50.*

## Calendar Of Events

**May 2-4**
Mecklenburg Dixie Classic Bowhunter tournament at the Mecklenburg Wildlife Club in Charlotte. Features a bow-hunters target shoot and an indoor target shoot.

**May 3-4**
18th-century Militia Muster at the Alamance Battleground State Historic Site in Burlington.

**May 4**
The Annual Ramp Convention in Waynesville. Features mountain music, arts and crafts, and of course, ramps.

**May 9-11**
14th annual Hang Gliding Spectacular at Jockey's Ridge State Park at Nags Head.

**May 18**
Latta Outdoors Festival at the Latta Plantation Park in Charlotte. Features canoeing and kayaking, demonstrations, and other events.

**May 23-25**
Riverspree on the Pasquotank River at Elizabeth City. Features entertainment, arts and crafts, a visit by the Elizabeth II, and other events.

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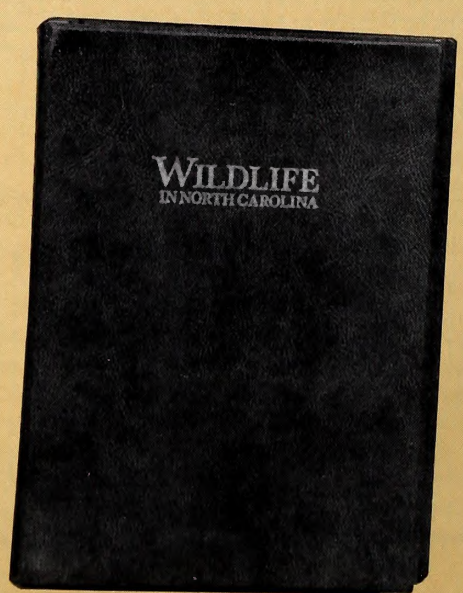

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# How To Avoid Boating Boo Boos

*by Jim Dean*

Put someone behind the wheel of a new car, and the worst that could happen might be loss of life. With a new boat, that's also a possibility, but only if you don't die of embarrassment first.

Several years ago at one of the Wildlife Resources Commission's popular free boating-access areas, a man and his two children backed a new boat down the ramp, and when the boat floated free of the trailer, his daughter stood holding the bow rope while the other two began to unload gear. It was only natural, of course, for them to pause a moment to admire the bright new boat as it floated there. Surely, the many other fishermen and boat owners who had gathered there must be envious. That's what they were all looking at, wasn't it? Or was it the fact that the boat seemed to be floating strangely with the stern much lower in the water than you'd expect.

"Say, Mister," said one of the onlookers. "Did you maybe forget the plug?"

The question didn't register at first because the boat owner was thinking of the plugs in his tacklebox. Why, he wondered, would anyone go fishing with only one plug?... "Oh, my heavens," he screamed in mid-thought, "I forgot to put the plug in the boat."

It was at that very moment that his daughter also asked all too innocently, "Daddy, is the boat supposed to have water in it?"

It would be bad enough to have to bail out a new boat if you were absolutely alone. This experience is not enhanced by adding a dozen curious onlookers who have forgotten the number of times they've done the same thing and are only thinking what a dope you must be.

Launching a boat with an unplugged drain is an especially common oversight with a new boat, but it's by no means the only one. Several of my close friends have backed their new boats into the water and wondered why the boat did not float free of the trailer. Indeed, once earlier this spring, a companion who will remain nameless because I don't want him to hate me, leaped into his boat and revved up a 50-horse outboard in reverse to try to back the boat off the trailer where it was mysteriously stuck. It was only after it became apparent that he was about to drag a stationwagon backwards into the water that he noticed that he had failed to unhook the strap that keeps the boat on the trailer.

Straps are a prime source of trouble, and failure to attach a strap can be even more dangerous than failure to unattach it. A few years back, I read an account of a fellow in Florida who had forgotten not only to strap down his boat, but also apparently failed to hook the boat securely at the bow. When he slammed on brakes to keep from running a red light, the boat flew off the trailer, slid over the top of his car and came to rest in the middle of the intersection where it was promptly hit by a truck. Fortunately, the only injuries were to pride and machinery.

I witnessed one disaster in northern Virginia when an unstrapped boat was blown off a trailer by a gust of wind from a passing truck. What was left of that boat was strewn for 200 yards along Interstate 95.

Other incidents are less disastrous. For example, most boat trailer lights are now sealed in waterproof housings so that you can back them into the water without damage, but not all of them are protected. Last year, a friend with a new boat reported that he had backed his trailer into the water to launch the boat. When the exposed light bulbs hit the cold water, they popped. "I'll bet you've never done anything as stupid as that," he said. "Naah, not me," I replied, trying to look sincere.

One of the potentially most common and costly mistakes is forgetting to tilt the motor up before you atempt to either launch the boat or drag it and the trailer out of the water. The lower unit on the motor will clear most ramps but not all, and if it doesn't you are likely to damage the motor or even the boat transom.

Once you've used a boat awhile, you usually learn to avoid a lot of these mistakes, but if you've bought a new boat this spring and you're itching to try it out, it would be well worth your time to make a checklist of these and other common oversights and consult that list when you take your boat out for the first time. While you're making this list, you may also want to make another list of all the equipment you're going to need. You can make copies and keep them with your tackle or in the glove compartment of your car. It's a fairly obvious suggestion, but it's almost guaranteed to save you some trouble or embarrassment sooner or later.

Of course, some boating mishaps seem to occur in spite of efforts to avoid them, and you can only hope they don't result in injury or worse. I'm thinking of the time I launched a 12-foot johnboat in a Coastal Plain lake and handed the bow rope to my son to hold while I went to park the trailer. When I returned, he was still holding the rope, but the boat was a good 25 yards from shore.

"I'm only guessing," he said, "but there seems to be some evidence here that you forgot to tie the other end of this rope to the boat. I'm also glad that you've always prided yourself on being a good swimmer."

As I stripped down to my shorts to make the retrieve, he added the usual friendly bit of comic relief that has become a standard remark in my family. "You big dummy," he said, chuckling at the prospect of my unscheduled dip.

And I gave him the standard family reply. "Oh, I ain't so big," I said, and plunged in.

June, 1986
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# WILDLIFE IN NORTH CAROLINA

*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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**Cover** *These maidenhair ferns are so named because they hang in a circular pattern that might remind us of the trailing locks of a maiden. Photograph by Harry Ellis.*

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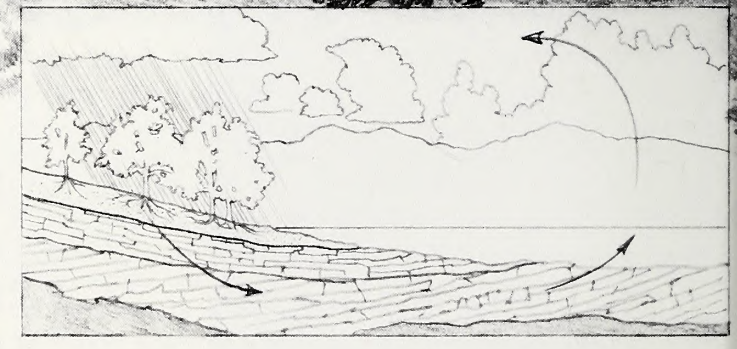


***The hydrological cycle*** *occurs when water is evaporated from lakes and oceans and also from the leaves of trees and other vegetation. Rising as vapor to the heavens, the water collects in clouds and eventually falls back to earth as rain, snow or hail. Some precipitation penetrates into the ground while most flows overland into creeks and streams which drain into lakes and oceans where the cycle of water begins once again.*

# The Unbroken Cycle Of Water

*written by Lawrence S. Earley / illustrated by David Williams*

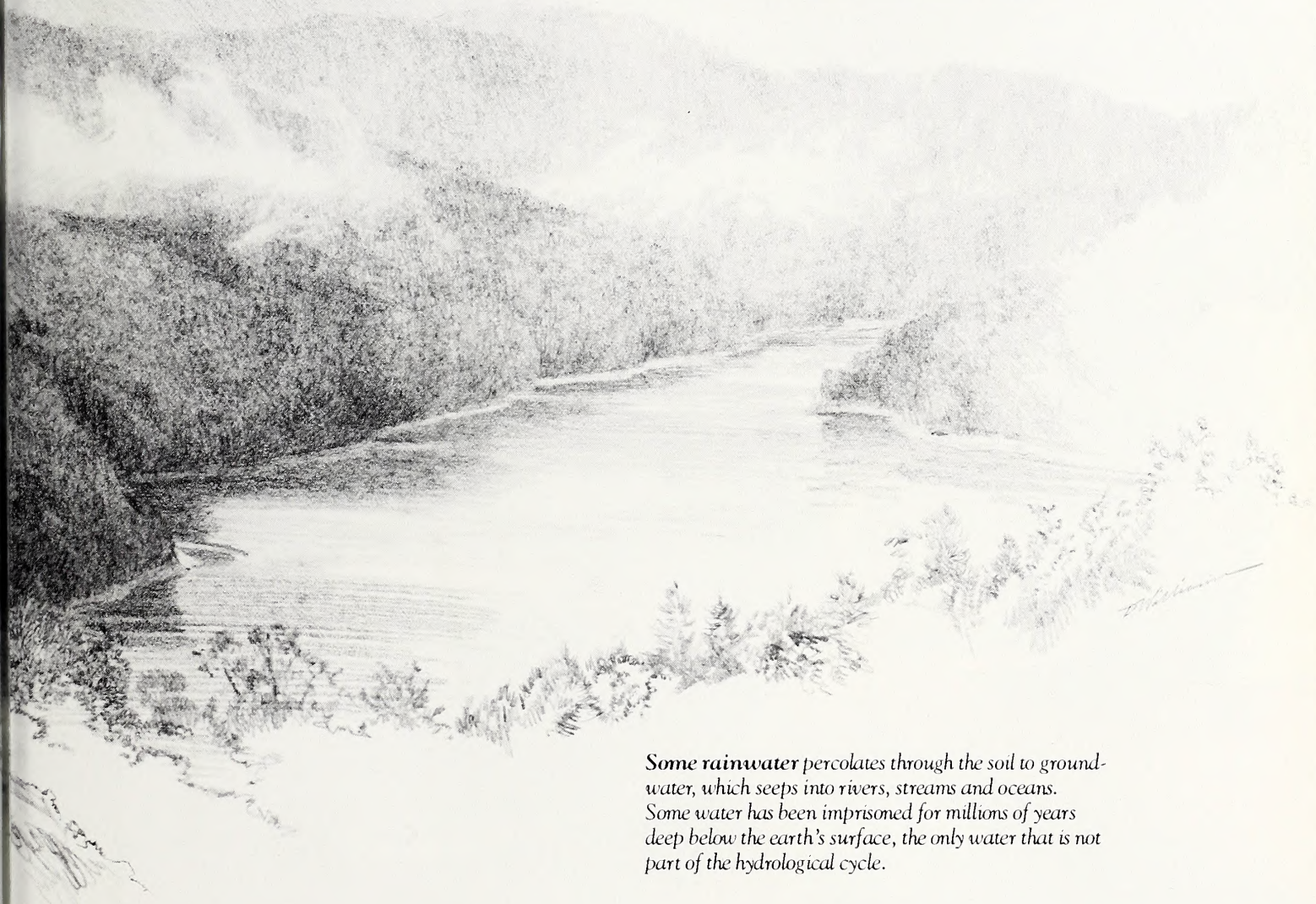
A good place to think about water is beside a river. The ceaseless flow of a river inevitably seems to lead the viewer to large questions. "Where am I going?" "Where did I come from?" Large questions, indeed, but no wider nor more philosophical than questions that may spring to mind about the water itself — where is it coming from? What inexhaustible source maintains that flow?

These questions have teased people in all times and places, but it has only been recently — within the last 300 years — that we've known pretty much how to answer them. Only recently have we understood the hydrological cycle.

The hydrological cycle means that water is continuously in motion, almost always on its way somewhere else. The ocean water that evaporates today will fall as rain or snow tomorrow. Rainwater and snowmelt will flow down rivers and streams to the ocean. The cycle will begin again.

The hydrological cycle teases one because it is so perfect — almost like a machine, I said, although how quickly a machine loses when compared to natural perfection. No water is ever lost from this cycle, and no more water is added to it. The same water present on earth three billion years ago is still present, whirled in a cycle that will have no end so long as the earth and its atmosphere exists. As Luna Leopold and Kenneth Davis write, "Last night's potatoes may have boiled in what was, ages ago, the bath water of Archimedes."

Activating this cycle and keeping it going is the sun. It



***Every 12 days**, all the moisture in the atmosphere falls to earth. The rainwater that falls in our mountains today may once have evaporated from the Caspian Sea.*

***Some rainwater** percolates through the soil to groundwater, which seeps into rivers, streams and oceans. Some water has been imprisoned for millions of years deep below the earth's surface, the only water that is not part of the hydrological cycle.*

provides the energy by which water in the liquid state evaporates and rises into the air in the gaseous state. An estimated 95,000 cubic miles of water are evaporated by the sun annually, with the oceans providing most of it (80,000 cubic miles) and lakes, moist soil and plants and animals providing the rest. As the water vapor rises, it cools and condenses into water droplets. Most of it falls right back into the oceans as rainfall.

The rest of these condensed droplets are blown toward land by prevailing winds where gravity forces them to earth as snow, hail or rain. Most of this precipitation runs off the land into rivers and streams, eventually returning to the oceans. Some of it percolates through the soil into groundwater collecting points, from which the water seeps into rivers and streams. The water that soaks into the earth is also available for plants and animals.

Plants and trees take water up in their roots, drawing it up sometimes astonishing distances to reach their leaves where it is emitted through leaf pores (stomata) in a process called transpiration. This water is also evaporated. A single birch tree transpires 60-80 gallons of water through its leaves on a warm day. Animals are also part of the process. They need water in order to live. A man of average build has 100 pounds of water in his body and releases some of it every day by exhaling, perspiring and excreting. He must replace about 2½ quarts daily.

Water is about as close to the eternal as anything we have on earth. It endlessly circulates around the world, in a process that is almost as old as the earth itself. Thinking about the hydrological cycle is a little bit like thinking about the infinite. It gives you the same shivery sort of feeling.

# TROUT & TERRESTRIALS

If you want to catch trout, you could do a lot worse than follow the advice found in Proverbs 6:6. "Go to the ant, O sluggard; consider her ways and be wise."

written and photographed by Tom Earnhardt

***Fly patterns*** *that imitate ants, beetles, grasshoppers, crickets and other terrestrial (land-dwelling) insects are superb trout catchers, especially during the summer and early fall. These flies are interspersed with some of the naturals — try to pick them out.*

*Go to the ant... O sluggard; Consider her ways, And be Wise.*

Proverbs 6:6
Revised Standard Version

Now I don't profess to be a Biblical scholar, but I do know that various passages are subject to different interpretations. Perhaps the writer of the passage quoted above was only using the tiny, hardworking ant to motivate those of us who are lazy.

However, I lean towards another interpretation. I believe the writer was an astute trout fisherman who was simply passing on sage advice about using ants and other terrestrials as bait. Even the term "sluggard" has on various occasions been used by spouses and employers to describe avid trout fishermen, albeit unfairly. Therefore, with apologies to theologians, permit me to offer my interpretation of Proverbs 6:6.

> Use ants and terrestrials, O noble fisherman; consider what good baits they are, and with such wisdom catch more trout.
>
> Revised Fisherman's Version

***Bob Bryant*** *admires the author's 21-inch brown trout taken on a size 24 cinnamon ant.*

When I was growing up in Thomasville in the mid-1950s the closest thing to a tackle shop was Cranford's Firestone store. It was my only source of size 10 Phillip's black ants, the kind that came packed under a plastic bubble. The ant was then, and still is, one of the best and most durable flies for bluegills and shellcrackers. After school on spring afternoons I caught countless bream and an occasional bass on ants in Davidson County's farm ponds.

During those same years my family spent several weeks each summer in the mountains near Bat Cave. Fly fishing for trout was my consuming passion those summers, and I was a regular on the Rocky Broad, Davidson, South Mills, and North Mills rivers. Occasionally, I ventured as far as Hazel Creek, the Nantahala, and Big Snow Bird. But, during those years I did not use ants or other terrestrial imitations for trout. Ninety percent of my fishing was done with the same few patterns — the Adams (male and female), Light Cahill, Royal Wulff, Muskrat Nymph and Tellico Nymph. To me, ants were for panfish and not a worthy fly for trout.

As my fishing skills improved over the next 20 years, I learned to tie and fish wet flies, dry flies, and streamers of all sizes and descriptions. The number of fly patterns I carried increased each time I acquired a vest with more pockets to hide extra fly boxes. By the mid 1970s I was still not intentionally using ants and other terrestrials for trout, although I had long carried and used Muddler Minnows which, when fished dry, resemble grasshoppers. I had also fished Wooly Worms which trout may mistake for a caterpillar. In the past few years, however, ants and other terrestrials have played an increasingly important role in fishing.

For those of you who are new to fly fishing for trout, flies are merely imitations of various foods that occur naturally in the trout's environment. Most commonly used patterns represent aquatic insects which have their life cycles in, and over, the water. The most important of these, mayflies, stoneflies, and caddis, come in a variety of sizes and colors. Most trout flies represent various stages of these aquatic insects. Flies which mimic the nymph stage are generally fished under the surface, while most dry fly patterns, representing the adult winged insect are fished on the surface.

Terrestrials, on the other hand, are land-based insects which only become a trout's meal after they fall in, or are blown in, the water. Ants, black and red, big and small, are terrestrials. Beetles, crickets, inchworms, and grasshoppers are also terrestrials. Now you may be asking yourself, why add, to an already bulging fly vest, a whole new class of flies? It's because terrestrials catch fish in situations where other patterns fail.

Terrestrials can be especially effective in North Carolina's freestone streams. Unlike the limestone and spring creeks of Pennsylvania and the western states, which are exceedingly rich in nutrients and high in insect life, our streams are not as blessed. We have excellent trout fishing, but North Carolina trout have to work harder for a

# TROUT & TERRESTRIALS

***In the summer*** *when trout streams are low and clear, and the heavy aquatic insect hatches of spring are over, terrestrial imitations still catch trout.*

living than their cousins in more food-ladened waters. Terrestrials, when properly presented to Tar Heel trout, present an easy meal not often passed up, and anglers should not hesitate to use terrestrial imitations anytime the weather is warm enough for naturals to be around.

Terrestrials are also especially useful when trout are actively feeding on aquatic insects, and you're unable to match the hatch. Recently, I caught a 21-inch, beautifully colored brown trout in just such a situation. I was fishing a tailwater stream below a dam where the fish are more likely to be selective than they are in freestone mountain streams. Bob Bryant and I tried unsuccessfully for almost an hour to match a hatch of tiny aquatics. Trout were sipping something off the surface, but we couldn't buy a strike using small, standard patterns. Bob was the first to switch to a floating size 20 black ant, and I soon began fishing a size 24 cinnamon ant. We both caught several nice fish up to 14 inches. The 21-inch brown took the tiny cinnamon ant, and after a 25-minute fight, it was admired and then released.

The point is that these fish refused a number of small nymphs and imitations of adult aquatics. When we quit trying the often difficult business of match the hatch, and gave the trout something entirely different, we caught fish. It's good to remember that when you can't match the hatch, try an ant, grasshopper, or beetle.

Another situation in which terrestrials are especially effective is when you are trying to catch trout from heavily fished water. I know of some streams so heavily fished that the trout see no less than six Royal Wulffs, four Adams', and two Tellico Nymphs per day. Kidding aside, in waters like these, you need flies that surprise — terrestrials. An ant or hopper floated under a rhododendron will often fool trout that have seen everything else.

I remember one occasion on the Davidson River when my pet fly for that stream, the Adams Female, had been totally rejected by even the smallest trout. There were a number of other anglers flailing the stream that early July day. After switching to a size 10 grasshopper pattern, I took six or eight nice rainbows. Some of those fish went out of their way to run down the big hopper. The noisy "plop" of the hopper actually seemed to attract them. An occasional twitch of the rod tip which made the fly "struggle" like a real grasshopper also seemed to help.

Why did the large hopper pattern work on heavily fished water? Maybe it was simply the right time of day to be fishing, but I suspect it was also new to the trout. It's also likely that the trout simply prefer hoppers to other foods.

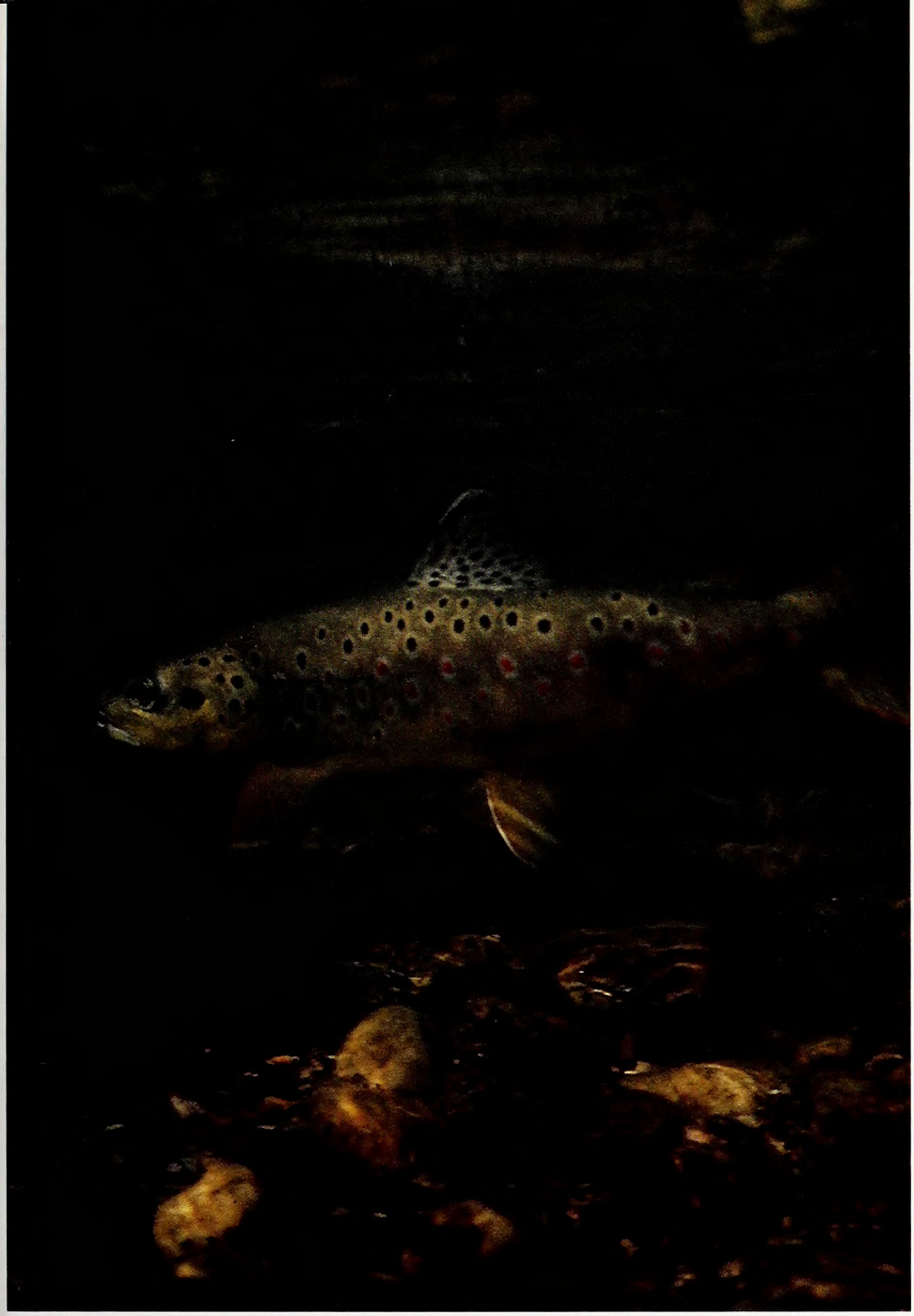
There are also certain times during the season when terrestrials should be your first choice. In the latter part of summer and into early autumn, ants, crickets, and especially grasshoppers, are in great supply. Meadows near streams are often alive with grasshoppers, and a thunderstorm can blow or wash a generous supply of terrestrials into nearby streams creating almost the same effect as a hatch on the stream. Several years ago a husband and wife fishing duo from Durham, Ed Jones and Gail Hill, introduced me to one of their favorite streams, the Whitewater River near Highlands. It had rained early in the morning, but the skies had cleared before we started fishing. Fishing was slow so all three of us went through a variety of patterns, including nymphs and dries. The first fish caught was a 12-inch brown with a belly which felt exactly like a beanbag. It was full of beetles which had probably been washed into the stream by the morning rain. A size 14 black beetle imitation drew instant results. The beetles were evidently so tasty to the trout that they seemed to shun all other food while the "beetle hatch" was present. Since Gail, Ed, and I had fished the river carefully with traditional patterns, we came away convinced that trout can, at times, have a one-track mind for terrestrials.

Please don't get the idea that I have forsaken standard fly patterns. I still consider the Cahills, Adams, Wulffs, Blue Wings, Tellico nymph, Muskrat nymph and Hare's Ear nymph indispensible, and I still fish these flies much of the time. I have learned from friends and experience, however, that terrestrials really are an essential part of a complete fly box.

My favorite ant patterns are very simple while my favorite grasshopper patterns are more complicated. The most effective sinking ants are tied on size 14 to 20 hooks (I still prefer size 10 for bream). These slow sinkers are nothing but two bumps of built-up thread — black or ginger in color — covered with three coats of clear lacquer. Between the bumps I make two or three turns of hackle, black or fiery brown, to give the effect of legs and antennae. The sinking ant is excellent fished by itself, but it also makes a great "dropper" fly when fished a foot under a large dry fly like a Royal Wulff.

The most successful floating ants in my box are tied on size 16 to 24 hooks. The bumps are made of black or dark ginger poly yarn, fur or wool. Between the bumps I use three turns of stiff hackle in the same color. These floating ants should be soaked in a good silicone floatant before use. There are other ants available on the market today. The balsa-bodied McMurray ants are effective, but for me, the simple patterns mentioned above have proved more effective and durable.

Grasshopper and cricket patterns come in an infinite number of variations. The Letort Hopper, Letort Cricket, Joe's Hopper and the Muddler are all good flies, but they lack one thing, legs. Dave Whitlock, one of



***This 16-inch brown trout*** *took a tiny terrestrial imitation that was presented on a light, long leader so that it drifted as naturally as a real ant that might have fallen into the stream.*

this country's most innovative fly tyers, has created two effective hopper imitations with large hind legs which are made of knotted turkey quill fibers. Whitlock's observations of grasshoppers have led him to conclude that the large kicker legs are the most important hopper feature. Knotted legs make his grasshopper patterns, Whit's Hopper and Dave's Hopper, incredibly realistic. Following Whitlock's lead, I now tie an all black cricket pattern with large kicker legs. All these flies are so buggy looking that you wouldn't be surprised to see one jump out of your hand.

Keep in mind that since nature has given us grasshoppers in all colors and sizes (light green to very dark brown), an angler should carry a variety of hoppers in his fly box. Several colors in sizes 10 to 14 should cover most situations.

Finally, there is the lowly beetle. Beetles may decimate your roses and cover your yard, but a good beetle pattern will also catch trout. As with the ant patterns I like simple imitations. My favorite beetle has a black poly yarn body, black clipped hackle legs, and a shell back made of a segment of black or bronze turkey quill fibers. This pattern, in sizes 12 through 18, is good fished dry or weighted. Another excellent beetle pattern is the Crowe beetle made of black deer hair. Regardless of which pattern you choose, a few floating and sinking beetles should become a permanent addition to your fly box.

Remember that terrestrials come in essentially the same sizes as ordinary wet and dry flies. Therefore, your 7- to 8½-foot flyrod matched with a 4, 5 or 6 flyline is ideal. However, if I were forced to choose one flyrod for North Carolina waters it would be 8-feet long and matched with a 5 line. Almost any reel will do, so long as it balances well with the rod.

The leader is perhaps the most overlooked part of any fly fisherman's tackle. Except in very tight quarters I am generally opposed to short leaders (less than 7 feet). Whenever possible I use a tapered leader of at least 9 feet, with 10- to 12-foot leaders being the rule rather than the exception. Tippets should not be less than 3 feet in length. The use of longer leaders with terrestrials and standard patterns helps minimize the possibility of spooking trout with the flyline. More important, however, long tippets help reduce drag, especially in the light, 4X to 7X range. Excessive drag, the thief of natural drift for both wet and dry flies, is one of the most common causes of fly rejection.

Also, be sure to match tippet size to the size of your fly. A size 10 or 12 grasshopper should be fished with a 4X tippet while a size 20 ant calls for 6X.

Fishing with ant and other terrestrial patterns is not new. I've just been slow catching on and don't want you to repeat my mistakes. Much has been written over the years by other writers (excluding the author of Proverbs) regarding the advantages of fishing terrestrials. One of the earliest and greatest works on angling, Sir Izaak Walton's *The Compleat Angler* (first published in England in 1653), contains some keen insights into the use of terrestrials for trout. Walton offers this conversation in which a fisherman instructs a hunter:

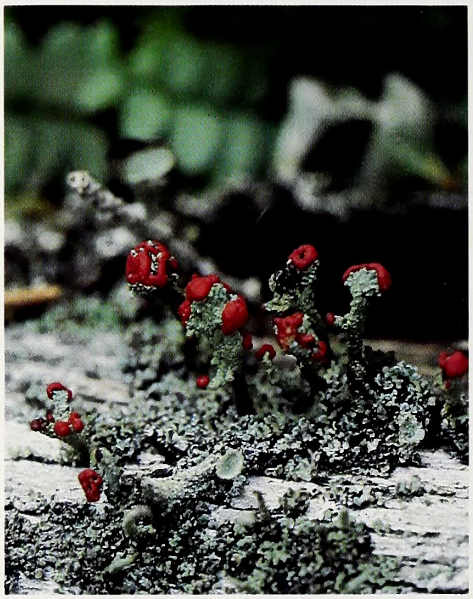
> "Then may I tell you... that any kind of fly, as the ant fly..., or beetle... will do very well.... And after this manner you may catch a trout in a hot summer evening: when as you walk by a brook, and shall see or hear him leap for flies, then if you get a grasshopper, put it on your hook... standing behind a bush or tree where the hole is, and make your bait stir up and down on top of the water, you may if you stand close, be sure of a bite...."

With the Bible, Walton, and this reformed angler as your sources of inspiration, any self respecting Tar Heel trout fisherman who doesn't now go to the ant and his ground-based brethren really is a sluggard.

# Rocks Where Time

While the natural world waxes and wanes nearly everywhere, life on the granite outcrops of the Piedmont remains much the same as it has for millions of years.

written and photographed by Lawrence S. Earley



***British soldiers*** (Cladonia cristatella) *are but one of many species of reindeer lichen to invade granite outcrops.*

You walk through a narrow fringe of young pines and hardwood trees. Up ahead the canopy opens, the trees disappear and suddenly you're looking at prehistory. It gives you a start to know that here's a piece of Piedmont that predates Columbus, the fall of Troy, the Paleolithic cave paintings at Lascaux and Altamira. When these rocks were exposed the saber-toothed tiger prowled the area looking for mastodons. Over the years the landscape around it changed from swamp forests to spruce forests and then to the temperate zone forest there today, but while the earth went mad and species came and went, this rock changed but little, greeting the new eras with essentially the same face.

I'm talking about the granite outcrop at Mitchell's Mill State Natural Area in Rolesville, probably the best known and most extensive of the many so-called flat rocks in North Carolina. Part of a belt running from southern Virginia to Alabama, these granite exposures run close to the surface and are exposed in several places in the eastern and western Piedmont, the largest of them in Wake and Franklin counties. The Rolesville pluton, as the geologists call the granite body underlying parts of these counties, is 50 miles long, 10 to 12 miles wide and many miles deep — the exact figure is not known. The Mitchell's Mill Outcrop is part of it.

But it's not the age of these outcrops that has drawn the scientific interest. It's their curious freight of vegetation and the saga of the life struggle that they teach.

At the Rolesville outcrop you'll notice the silver gray of the granite as it slopes gently toward Cedar Fork Creek, a tributary of the Little River. The rock has a slightly humped shape, and yet it has its little depressions where the water gathers after a rain or when the river floods. Some of these hollows are completely bare, but others have trapped a thin layer of soil that supports grass and shrubs. Interrupting the granite monotony are fingers of forest that have invaded the rock here and there.

The bare rock itself is not very hospitable to life, it would seem. Get down on all fours. Think like a bobcat or test the rock surface like an oak seedling. Food? Not much here. Soil for roots, water and oxygen? Forget it. Even the seasons conspire against life here. Winter rains scour the rock; winds blow it clean; August droughts bake it. Compared to the young pine forest that surrounds it, it's a Lazarus at the rich man's doorstep. It's marginal existence by any measure.

***Smooth granite*** *of Mitchell's Mill totes a curious freight of mosses, lichens and unusual plant species.*

# Stands Still

***Lichen are often considered*** *pioneers in primary succession, although mosses can begin to grow quite independently. These foliose lichen grip the granite with minute hairs that help create soil particles. (Zone I)*

***The colorful succulent*** (Sedum smallii) *is growing in this temporary January pool. These succulents can grow in both wet and parched conditions, making them an ideal inhabitant of granite outcrops. (Zone II)*

***In a further stage*** *of development, mats of moss have covered a section of rock, trapping soil that supports the flowering sandwort (*Arenaria glabra*). (Zones III, IV)*

# *Life On Bare Rock*

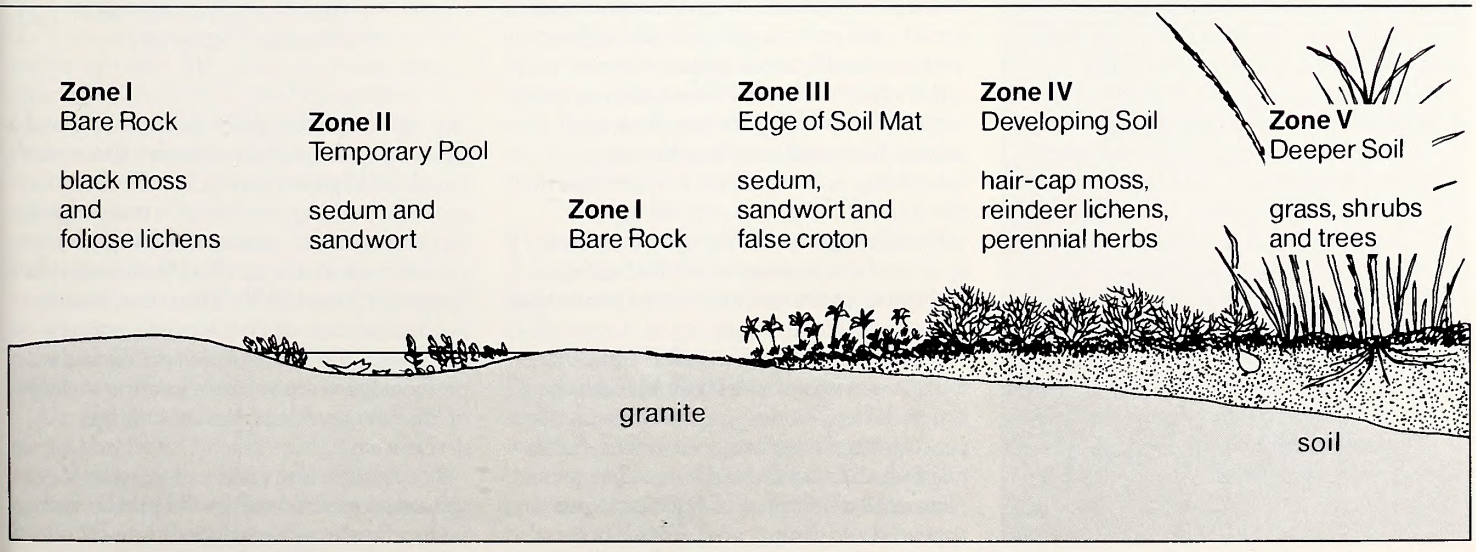
*Granite outcrops support lichens and mosses, for the most part, which are primitive plants adapted to harsh environments. These plants grow in strict order, each preparing the way for the next stage.*

*Cross section of a granite outcrop shows several zones of vegetation. On sloping rock scoured by rain or floodwaters, black moss and lichens may get a foothold (Zone I). In temporary pools, annual plants that can tolerate parched and flooded conditions take root (Zone II).*

*On flatter rock, there is a succession of species as the soil gradually builds up. Lichens and black moss grow on the periphery of the mat (Zone I) and where a tiny layer of soil collects some annual flowers take root (Zone III). As soil deepens, mats of hair-cap moss and reindeer lichens develop with perennial plants (Zone IV). In the deepest sections (Zone V) are shrubs, trees and grasses.*

*Zone V is the oldest zone, while Zone I consists of pioneers colonizing bare rock.*

*Many stages of succession can be seen, from foreground moss pioneers to plants on deeper soil. (Zones I-V)*



## Hot Rocks

The ancient and quiet world of granite outcrops was enmeshed in 20th-century controversy recently when Wake, Johnston and Franklin counties were named among the winners of a national sweepstakes that focused on those counties' deep granite deposits.

The U.S. Department of Energy singled out 12 granite bodies in seven states for the possibility of housing the nation's second high-level nuclear waste repository. Among the study sites selected were two in North Carolina, a 142-square-mile area in parts of Wake, Johnston and Franklin counties, and a 105-square-mile section of Buncombe, Haywood and Madison counties.

The federal government's Crystalline Repository Project studied 235 crystalline rock bodies in 17 states before narrowing the search to 12. Crystalline rock deposits, which include granite and similar rock, are considered safe for nuclear waste burial because of the rock's strength, low porousness and low moisture content.

The nuclear waste to be stored in the deep-mine repository comes in the form of radioactive rods 12 to 13 feet long. Ten thousand tons of this waste material has been stored temporarily at nuclear reactor sites around the country awaiting permanent disposal.

The Energy Department plans call for a shaft to be sunk 1,000 to 4,000 feet below the surface where a network of tunnels would run through 2,000 subterranean acres. The waste would be buried and the vaults plugged.

State officials have raised objections to the North Carolina sites. High populations and unstable granite make the eastern site unsuitable, they say, while narrow mountain roads in the west make the western site unacceptably hazardous.

Federal officials say that the final choice among these study sites will not be made until 1998, after many years of field study. Construction of the repository would not be completed until well into the new century.

Public hearings have already been held on the subject of the repositories, and more are planned.

***Trapped soil deepens*** *the vegetation mat. This pine seedling is growing out of a bed of dried hair-cap moss* (Polytrichum ohioense).

And yet, look more closely at the rock, especially at a punkish crewcut of vegetation that's growing there. In circular swirls and broad mats you may see reds and whites, young emerald greens against a silver, wintry green. They are lichens and mosses, with a few flowering species thrown in among them, and in spring the entire assemblage is dressed out. If you're not in the spirit of things you may shrug, but you're shrugging off a doughty drama of spectacular adaptation — of life finding a niche even on stone. Something there is that loves a rock.

The secret to life on a rock is time. Plants will grow on granite but only in a strictly ordered succession of species that may take centuries and even longer to unfold. Each plant provides a foothold for a subsequent plant until a full range of vegetation has appeared and disappeared. This is how an oak-hickory forest develops from a cleared field, a process called secondary succession. An old field grows grass, then shrubs, saplings, a young pine forest, a mature pine forest and finally, in about 150 to 200 years, an oak-hickory forest. (See "Landscape In Progress," June 1985.) When the process begins with bare rock it is called primary succession. Primary succession "inducts previously barren surfaces into the society of life," as naturalist Michael Godfrey describes it.

For bare rock to yield a succession of species, however, soil has to build up and water must be retained, conditions hard to

meet on exposed rock. Many years are necessary before even a little bit of soil can be stabilized. On the outcrops at Mitchell's Mill, the first things that grow are lichens. These primitive plants cling to the granite by pushing an anchoring thread into the rock after first secreting acids that break it down into tiny grains. Lichens don't need organic debris for nourishment, and they help weather the rock and create grains of soil.

For many years botanists thought that lichens were the pioneers in the soil-making process on bare rock, but over the past 40 years researchers have shown otherwise. Dr. Patricia Palmer, professor of biology at Louisburg College studied the plant life on another outcropping from the Rolesville pluton, the five-acre Overton Rock in Franklin County. She says that "you really get very little soil buildup by the crustose lichens because the wind would blow the soil away just about as fast as the lichen would break down the rocks."

The true pioneer in the soil-trapping process, says Palmer, is a black moss (*Grimmia laevigata*). After a rainstorm it's a dark green, but most of the time it's a dull black. Perhaps there's a tiny crevice or a roughened surface where some soil can gather. That's all this moss needs. A little colony takes hold, usually out in the middle of the rock because the moss does not flourish in shade and is discouraged by excessive water. It creeps out across more rock, trapping wind-and water-borne soil. Also growing on the peripheries of the spreading vegetation are the tiny red succulent *Sedum smallii* and *Talinum teretifolium*. Associated with this stage are annual plants such as the single-flowered sandwort (*Arenaria glabra*) and false croton (*Crotonopsis elliptica*). They are all hardy plants. The *Arenaria* can stand in water and yet also survive when the ground is parched.

Now reindeer lichens can grow on the spreading mat of vegetation. More soil builds up under the mat and another moss species, the hair-cap moss (*Polytrichum ohioense*), invades it. The soil is growing deeper and the mat is holding water like a sponge. Perennial plants find this encouraging habitat.

At this point the pioneer mosses and lichens are disappearing. The mats of hair-cap moss become fertile ground for flying seeds of shrubs and trees like sumac and pine that will grow in shallow soil. Broomsedge and other grasses begin to grow.

On any granite outcrop, many of these stages may be found and some mats may have all stages of primary succession represented. The depth of the soil determines the kinds of vegetation that will grow. The mats tend to move outward from a central spot. The center, representing the most advanced stages of succession, may have soil 6 inches deep hosting broomsedge and sumac. On the peripheries, the pioneer mosses are colonizing the bare rock. In between are varying depths of soil and wetness and a variety of plants that conform to these conditions.

Theoretically, at least, in time the process of primary succession would cover the rock in grass, while secondary succession would make further advances, although the shallow soil might have hindered a mature forest from developing. But vast areas on these flat rocks are still bare, while only pioneer lichens and mosses have taken hold elsewhere. What's holding up the process?

It's rather like climbing up one step and falling back two, explains Palmer. "If you have a heavy rain you can wash away one of those mats that took maybe hundreds of years to form." Remember how harsh an environment bare rock is, washed by winter storms, baked and dried out by an August sun? A summer's drought can easily kill the pine that grows in 6 inches of soil in the center of the mat, while a torrential downpour can slip a mat from its mooring like a loose hairpiece. We're back to zero point again. Succession must begin all over.

One of the intriguing topics that has puzzled scientists is how long this interrupted process has been going on. Some researchers in the late 1930s suggested that it was a relatively recent phenomenon, that the rock had been covered by a thin soil cover and forest up until the Europeans arrived. When the new settlers logged the forests, they caused erosion that ultimately stripped the cover from the rock. For the past several hundred years, according to this theory, the forest has been fruitlessly trying to reestablish itself over the bare rock.

Palmer believes the outcrops are of more ancient origin. "Apparently, there are some areas where there has been very little disturbance by lumbering and cultivation where you get these rock outcrops," she says. Early collectors like William Bartram also mentioned the flat rocks as early as the 18th century.

Indeed, some researchers maintain that if there has been a forest cover, it's been gone not for a few centuries, but for hundreds of thousands or perhaps even millions of years. In 1943, Rogers McVaugh, a U.S. Department of Agriculture scientist who studied many outcrops in the Southeast, wrote that the interrupted successional process on the rocks was essentially "self-perpetuating." Basically, there would never be a forest there.

McVaugh offered several reasons for this theory. The smooth, unweathered surface of the rock suggested to him that no soil covering had ever covered it. The shallow depressions in the rock must have been caused by erosional processes that stretched far back in time. Even more convincing, however, were the kinds of vegetation that grew on the rocks. McVaugh found that of the 44 species characteristic of rock outcrops in the Southeast, more than a third grew nowhere else — they were endemics, in botanical parlance — and 10 additional species were rare except on these flat rock exposures. This indicated to him that the rock exposures had been occupied by plants for a long time. Additionally, he found many of these plants were related to species from the semi-arid Southwest, and he hypothesized that millions of years ago, as the Piedmont rose from the seas that covered it, plant species from the west colonized the rocks, evolving separately up to the present.

Other researchers have more recently speculated that the outcrops were exposed at different times, some of them earlier than others. But at least some of them were of ancient origin. Then when other rocks were later exposed, the vegetation was able to move in quickly from these nearby island outcrops.

The rock outcrops at Mitchell's Mill and Overton and other places in the Piedmont are one of North Carolina's little known natural treasures. Because of their rare plant communities, Mitchell's Mill has been named a state natural area. The Triangle Land Conservancy, a private organization that acquires and manages natural areas, recently was given two other Wake County outcrops. They are a phenomenon of space and time, exposed perhaps millions of years ago and populated by plants that packed their bags in Mexico nearly as long ago. It's a harsh world, these outcrops, where a green frizz of vegetation turns out luxuriantly at one time of year and crackles underfoot at another. A desert is the closest thing to it.

"I tell my classes we're going to go out today and look at a little desert in Franklin County," says Palmer about the Overton Rock Outcrop. "But you don't have to be a botanist to appreciate the beauty of these spots. In the spring it's really spectacular. You get the mosses and the lichens and the little *Sedums*, all blooming together. Even the students who are not particularly interested in plants are pretty impressed by just the overall patterns of the vegetation."

And by the insistence of life, that finds nourishment even in one of the harshest of habitats, the world of bare rock. ⊠

# Checking In On HAZARDOUS WASTE

Since 1980, the production of hazardous waste in North Carolina has grown 62 percent, but not all the news is bad. New laws are beginning to have an effect.

by Rick Estes

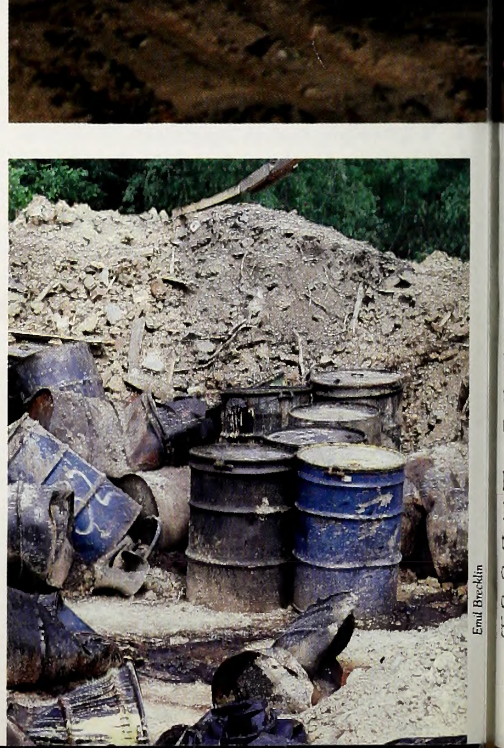
Even as recently as 1980, most North Carolinians thought that problems with hazardous waste were pretty much confined to the industrial states of the Northeast or Midwest. With this state's traditional rural and agricultural background, it simply seemed unlikely to many of us that we might share those deadly problems.

Indeed, except for isolated reports, little had appeared in the press to dispel this belief, and certainly no overall view of the potential nightmare that faced us. In 1980, however, a report based on 1979 figures ranked North Carolina 11th nationally in the production of hazardous waste. This report sparked an in-depth feature titled "Hazardous Waste" published in the March 1980 issue of *Wildlife In North Carolina*. One of the most shocking incidents reported in that article was the discovery of an illegal chemical dump next to a residential area on Kelly Road in Charlotte. In a second dump, near the small coastal town of Holly Ridge, some 3,000 barrels of 2, 4-dinitrophenol, a highly toxic industrial dye, had been stored in a dilapidated building for over four years. Dead animals had been discovered at the site. A mere 3 milligrams of this substance would prove fatal to humans. These were but two of the hazardous waste dumps revealed, and it was immediately obvious that North Carolina had not been spared the potential horrors associated with hazardous waste. Love Canal could happen here. Would it? Were there already other illegal chemical dumps waiting to be discovered?

With the disposal of hazardous waste becoming a major news story in North Carolina since 1980, it seems appropriate to review what has happened in the intervening years.

Six years ago, North Carolina produced 1.8 billion pounds of hazardous waste. In 1984, the latest figures that are available, 2.9 billion pounds were produced in the state. That's a 62 percent increase. In 1980, we ranked 11th among the states in the amount of wastes produced, and although comparable rankings aren't available for 1986, our state's rapid growth would lead us to believe we're still near the top of this category.

Since 1980, hazardous waste has been a hot topic in the news media, the courts, and state and federal legislatures. Yet most of us still wonder where we stand today? How much progress have we made in learning how to deal with the hazardous waste problem? Do these poisonous materials still threaten us and the environment as they did when Love Canal caused a national shudder?



Emil Brecklin

***This Kelly Road** chemical dump site near Charlotte was cleaned up by state agencies several years ago, and now is hardly recognizable as a former hazardous waste problem.*

Emil Brecklin

**The Environmental** *Protection Agency's "Superfund" has paid for the clean-up of several hazardous waste sites in North Carolina. The contents of these barrels, from "Potter's Pits," an illegal dump site in Brunswick County, are being emptied and neutralized for safe disposal.*

And just what is hazardous waste?

The last question is by far the easiest to answer. Hazardous waste is a solid waste or a combination of solid wastes. Because of its quantity and concentration, or its chemical, physical or infectious characteristics, it may cause serious illness, or threaten human health or the environment when improperly treated, stored, disposed of, or otherwise managed.

This definition is contained in the Resource Conservation and Recovery Act of 1976. It is one of many federal and state laws that have been passed dealing with hazardous waste. In fact, as far as legislation is concerned, the hazardous waste problem is being met in a significant way. Twelve major and 20 "minor" federal laws regulate the handling of these substances. In addition, eight state laws have been passed to help handle the hazardous waste problem in North Carolina. Of these 40 laws, 34 were passed since 1970.

Overall, North Carolina has led the way in developing programs and regulations to meet the situation. Ours was the first state to gain approval from the federal Environmental Protection Agency to implement state guidelines for managing hazardous waste. Also, North Carolina state government, industries, research institutions and citizen groups developed the nation's first official Pollution Prevention Pays program.

State law now requires groundwater

***While solid wastes*** *are not necessarily hazardous, the sheer volume of our growing population's discards is creating serious disposal problems.*

Debbie Conger

***The water*** *leaving landfills must be monitored to ensure the safety of the downstream environment. Department of Human Resource employees Gary Babb (foreground), Thomas Karnoski (left) and Steve Phibbs test the pH of a stream near a landfill.*

Emil Brecklin

monitoring wells at all licensed sanitary landfills. A manifest system has been initiated that requires written records of hazardous waste from its production through its final disposal or treatment. This "cradle to the grave" monitoring system was seen as a top priority by state officials in 1980. We now have federal and state "superfund" monies to help pay for cleanup when spills or improper disposal require remedial action. But, is the hazardous waste problem in North Carolina solved? Can we move on from this environmental threat and take on some other problem? Not quite.

There is still no approved land-disposal hazardous-waste facility. Furthermore, though groundwater monitoring is required at landfills, we're just now getting around to verifying whether it's really being done. We also have no large-scale general hazardous-waste treatment facility in the state, and don't forget, our production of hazardous waste has increased by 62 percent between the 1978 and the 1984 reports.

In other words, there's some good and bad news. We do have more rules and regulations, but laws alone do not solve problems. There is a more accurate reporting of waste generation by industry, but these reports may only identify potential problems, they don't eliminate them. We have the technology to deal with most hazardous substances we produce, but that was true six years ago.

Actually, one of the best incentives to reduce hazardous waste is financial. According to Bill Meyer, head of the solid and hazardous waste management branch of the state's Department of Human Resources, "One of the biggest factors at work here is the market place. The whole process is dynamic—there is a whole lot more generation (of waste now), but there is also a considerable reduction in volume. This reduction in the final volume of waste reported is achieved because it makes liability insurance easier to get and to afford."

Indeed, the cost of liability insurance for generators, as well as treaters, storers and disposers (TSDs) of hazardous waste, is having an impact on the whole process.

# Big Game Tag Report Number 10

## *. . . a summary of North Carolina's big game harvest for 1985-86 as reported by hunters to Wildlife Cooperator Agents*

Why should a hunter go out of his way to tag and report the turkey gobbler he just shot? How many deer were harvested during the season here in North Carolina? Was the total deer harvest for this period greater or less than this figure for last season? How is this information used? These are questions that often surface during discussions of North Carolina's big game tagging system. The big game tagging system is a reporting procedure which requires that all wild turkey, boar, bear and deer which are harvested by hunters here in the state be tagged at the site of harvest and that certain information be reported to any one of approximately 1,500 Wildlife Cooperator Agents for later collection by the Wildlife Resources Commission. This procedure became mandatory in the fall of 1976. Successful game management is based on many factors and individual pieces of information, including in this case, big game harvest figures. The more a game manager knows about population trends and numbers, the easier it is for him to make decisions affecting seasons, bag limits and other regulatory matters. Sound big game management must be the result of the combined efforts of sportsmen and the staff of the Wildlife Commission. While the figures in this report represent the reported harvest and may vary from the actual harvest, they are the best such figures available at this time. Please do your share to see that future reports of this nature are as complete as possible by tagging and reporting your big game harvests and by encouraging your fellow sportsmen to do the same.

If you have questions about the procedures or this report, please contact the Division of Wildlife Management, North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Archdale Building, Raleigh, North Carolina 27611.

### 1985-86 Reported Black Bear Harvest

| County | Male | Female | Sex Unk. | Total | Game Land | Other Land | Unk. Land | Rifle | Shot-gun | Hand-gun | Gun Unk. Or Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Avery | 2 | 1 | | 3 | 2 | 1 | | 3 | | | |
| Bladen | 7 | 7 | | 14 | | 8 | 6 | 8 | 5 | | 1 |
| Brunswick | 5 | 3 | | 8 | | 8 | | 4 | | 3 | 1 |
| Buncombe | 3 | 2 | | 5 | 1 | 4 | | 5 | | | |
| Burke | 2 | | | 2 | 2 | | | 2 | | | |
| Caldwell | 1 | | | 1 | | 1 | | | | | 1 |
| Carteret | 8 | 3 | | 11 | 2 | 8 | 1 | 10 | 1 | | |
| Cherokee | 10 | 3 | | 13 | 12 | 1 | | 10 | | 2 | 1 |
| Clay | 8 | 10 | | 18 | 15 | 1 | 2 | 15 | | 2 | |
| Columbus | 8 | 3 | | 11 | | 9 | 2 | 8 | 3 | | |
| Cumberland | | 2 | | 2 | | 2 | | | 2 | | |
| Duplin | 1 | 2 | | 3 | | 2 | 1 | 3 | | | |
| Graham | 21 | 10 | 1 | 32 | 27 | 3 | 2 | 15 | | 2 | 1 |
| Haywood | 10 | 14 | | 24 | 23 | | 1 | 18 | 5 | 1 | |
| Jackson | 1 | 5 | | 6 | 6 | | | 6 | | | |
| Jones | 8 | 6 | | 14 | 7 | 2 | 5 | 12 | 1 | | 1 |
| Macon | 25 | 13 | | 38 | 38 | | | 38 | | | |
| Madison | 3 | 1 | | 4 | 3 | 1 | | 4 | | | |
| McDowell | 11 | 6 | | 17 | 13 | 3 | 1 | 13 | 1 | 2 | 1 |
| Mitchell | 1 | | | 1 | 1 | | | 1 | | | |
| New Hanover | 3 | 2 | | 5 | | 5 | | 4 | 1 | | 1 |
| Onslow | 2 | 8 | | 10 | | 10 | | 7 | 2 | | 1 |
| Pamlico | 5 | 1 | | 6 | | 6 | | 6 | | | |
| Pender | 27 | 21 | 1 | 49 | 10 | 30 | 9 | 36 | 8 | 3 | 2 |
| Sampson | | | | 0 | | | | | | | |
| Swain | 4 | 1 | | 5 | 4 | 1 | | 5 | | | |
| Transylvania | 7 | 1 | | 8 | 4 | 3 | 1 | 7 | 1 | | |
| Watauga | | | | 0 | | | | | | | |
| Yancey | 6 | | | 6 | 2 | 4 | | 5 | 1 | | |
| **Totals** | 189 | 125 | 2 | 316 | 172 | 113 | 31 | 245 | 31 | 15 | 11 |

## 1985-86 Reported White-Tailed Deer Harvest

| County | Sex Harvested | | | | Total Harvest | Antlered Bucks Per Sq. Mile[a] | Weapon | | | | | Location | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Antlered Bucks | Button Bucks | Does | Not Listed | | | Shotgun | Rifle | Muzzle-Loader | Bow | Hand-gun | Game Lands | Other Lands |
| Alamance | 253 | 25 | 51 | 1 | 330 | 1.33 | 79 | 191 | 38 | 22 | | | 330 |
| Alexander | 95 | 7 | 23 | | 125 | 0.57 | 5 | 78 | 20 | 22 | | | 104 |
| Alleghany | 460 | 89 | 265 | 1 | 815 | 3.81 | 5 | 515 | 114 | 179 | 2 | | 815 |
| Anson | 642 | 75 | 235 | | 952 | 1.82 | 218 | 575 | 89 | 59 | | 23 | 755 |
| Ashe | 325 | 46 | 172 | | 543 | 1.33 | 7 | 331 | 90 | 113 | 2 | 10 | 462 |
| Avery | 55 | 3 | 9 | | 67 | 0.30 | 3 | 51 | 2 | 11 | | 55 | 9 |
| Beaufort | 1,114 | 92 | 461 | 4 | 1,671 | 2.37 | 179 | 1,383 | 41 | 30 | 4 | 68 | 1,412 |
| Bertie | 1,090 | 152 | 677 | 6 | 1,925 | 2.21 | 1,366 | 473 | 16 | 20 | 2 | 47 | 1,578 |
| Bladen | 1,513 | 97 | 530 | 1 | 2,141 | 2.27 | 1,270 | 774 | 26 | 39 | | 42 | 1,722 |
| Brunswick | 953 | 88 | 455 | 2 | 1,498 | 1.47 | 1,201 | 228 | 20 | 11 | 1 | 13 | 1,274 |
| Buncombe | 50 | 3 | 8 | | 61 | 0.12 | 3 | 45 | 7 | 6 | | 20 | 41 |
| Burke | 616 | 60 | 230 | | 906 | 1.60 | 58 | 682 | 43 | 122 | 1 | 241 | 622 |
| Cabarrus | 16 | 1 | | | 17 | 0.10 | 13 | 2 | 1 | 1 | | | 16 |
| Caldwell | 294 | 14 | 53 | | 361 | 0.82 | 19 | 284 | 13 | 42 | 1 | 136 | 202 |
| Camden | 150 | 7 | 29 | | 186 | 1.04 | 119 | 66 | | 1 | | | 186 |
| Carteret | 197 | 12 | 51 | | 260 | 0.65 | 107 | 133 | 9 | 6 | | 55 | 178 |
| Caswell | 848 | 111 | 374 | | 1,333 | 3.25 | 579 | 548 | 97 | 85 | 1 | 133 | 1,099 |
| Catawba | 97 | 3 | 10 | | 110 | 0.61 | 7 | 58 | 17 | 25 | | | 110 |
| Chatham | 692 | 37 | 154 | | 883 | 1.47 | 121 | 552 | 104 | 94 | 3 | 216 | 627 |
| Cherokee | 5 | | 1 | | 6 | 0.01 | | 5 | | 1 | | 6 | |
| Chowan | 426 | 61 | 310 | 3 | 800 | 5.23 | 256 | 484 | 14 | 22 | 5 | | 800 |
| Clay | 48 | | 1 | | 49 | 0.27 | 4 | 41 | 3 | 1 | | 38 | 10 |
| Cleveland | 66 | | 2 | 1 | 69 | 0.32 | 1 | 62 | 1 | 4 | | 1 | 59 |
| Columbus | 1,143 | 75 | 298 | 1 | 1,517 | 1.76 | 1,070 | 358 | 28 | 19 | 2 | | 1,517 |
| Craven | 1,292 | 92 | 407 | 1 | 1,792 | 2.61 | 366 | 1,284 | 42 | 48 | 4 | 114 | 1,488 |
| Cumberland | 663 | 125 | 460 | 2 | 1,250 | 1.81 | 139 | 1,032 | 12 | 57 | | | 1,250 |
| Currituck | 159 | 14 | 56 | | 229 | 1.50 | 85 | 115 | 1 | 14 | | 3 | 210 |
| Dare | 117 | 6 | 5 | | 128 | 0.45 | 52 | 55 | 7 | 12 | | 78 | 36 |
| Davidson | 384 | 49 | 120 | 5 | 558 | 1.50 | 13 | 363 | 84 | 91 | | 47 | 481 |
| Davie | 204 | 18 | 61 | | 283 | 1.84 | 13 | 197 | 38 | 34 | | 2 | 261 |
| Duplin | 628 | 43 | 139 | | 810 | 1.36 | 347 | 440 | 4 | 3 | | | 662 |
| Durham | 144 | 20 | 74 | | 238 | 0.94 | 99 | 87 | 28 | 16 | 3 | 111 | 108 |
| Edgecombe | 612 | 68 | 297 | 2 | 979 | 2.48 | 450 | 456 | 18 | 23 | 1 | | 979 |
| Forsyth | 11 | | 2 | | 13 | 0.08 | | 8 | 1 | 4 | | | 13 |
| Franklin | 625 | 30 | 103 | | 758 | 2.24 | 499 | 239 | 8 | 8 | 3 | 18 | 670 |
| Gaston | 24 | 2 | 7 | | 33 | 0.14 | 5 | 12 | 4 | 12 | | | 33 |
| Gates | 1,021 | 279 | 988 | 2 | 2,290 | 4.23 | 1,858 | 323 | 22 | 27 | 5 | 32 | 2,056 |
| Graham | 12 | 1 | | | 13 | 0.04 | | 12 | | 1 | | 13 | |
| Granville | 769 | 58 | 200 | 1 | 1,028 | 2.34 | 358 | 507 | 88 | 60 | 1 | 123 | 751 |
| Greene | 66 | 1 | | | 67 | 0.54 | 24 | 41 | | | 1 | | 67 |
| Guilford | 82 | 2 | 20 | 1 | 105 | 0.34 | 21 | 60 | 10 | 12 | | | 105 |
| Halifax | 1,186 | 151 | 652 | 2 | 1,991 | 2.93 | 569 | 1,256 | 43 | 55 | 12 | 9 | 1,665 |
| Harnett | 92 | | | | 92 | 0.28 | 61 | 26 | | 3 | 2 | | 85 |
| Haywood | 108 | 2 | 8 | | 118 | 0.26 | 4 | 100 | 5 | 9 | | 107 | 7 |
| Henderson | 98 | | 4 | | 102 | 0.43 | 2 | 91 | 4 | 5 | | 65 | 32 |
| Hertford | 481 | 85 | 361 | 1 | 928 | 2.07 | 712 | 195 | 5 | 4 | 1 | | 928 |
| Hoke | 68 | | | | 68 | 0.27 | 57 | 9 | | 2 | | | 68 |
| Hyde | 496 | 63 | 300 | 5 | 864 | 1.44 | 221 | 507 | 49 | 65 | 1 | 31 | 762 |
| Iredell | 313 | 30 | 62 | 2 | 407 | 1.27 | 18 | 268 | 71 | 49 | 1 | | 407 |
| Jackson | 5 | | | | 5 | 0.01 | | 5 | | | | 5 | |

| County | Sex Harvested | | | | Total Harvest | Antlered Bucks Per Sq. Mile[a] | Weapon | | | | | Location | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Antlered Bucks | Button Bucks | Does | Not Listed | | | Shotgun | Rifle | Muzzle-Loader | Bow | Hand-gun | Game Lands | Other Lands |
| Johnston | 200 | 19 | 60 | | 279 | 0.50 | 70 | 178 | 4 | 20 | 1 | 1 | 236 |
| Jones | 1,085 | 90 | 402 | | 1,577 | 3.05 | 235 | 1,264 | 33 | 14 | 4 | 109 | 1,246 |
| Lee | 53 | | 1 | | 54 | 0.32 | 7 | 37 | 2 | 7 | | 10 | 41 |
| Lenoir | 273 | 24 | 80 | | 377 | 1.43 | 51 | 314 | 2 | | | | 315 |
| Lincoln | 24 | 2 | 5 | | 31 | 0.17 | 5 | 14 | 4 | 8 | | | 31 |
| Macon | 112 | 2 | 3 | | 117 | 0.26 | 5 | 102 | 4 | 6 | | 95 | 17 |
| Madison | 41 | 2 | 9 | | 52 | 0.12 | 1 | 37 | 2 | 11 | | 30 | 18 |
| Martin | 720 | 52 | 165 | | 937 | 2.52 | 569 | 330 | 11 | 10 | 2 | | 937 |
| McDowell | 236 | 7 | 38 | | 281 | 0.65 | 10 | 202 | 16 | 53 | | 169 | 103 |
| Mecklenburg | 13 | 6 | 16 | | 35 | 0.06 | 28 | | 4 | 3 | | | 35 |
| Mitchell | 69 | 3 | 10 | | 82 | 0.43 | | 60 | 3 | 18 | 1 | 20 | 62 |
| Montgomery | 1,059 | 172 | 512 | 3 | 1,746 | 2.72 | 225 | 1,071 | 222 | 195 | 9 | 285 | 1,352 |
| Moore | 167 | 7 | 35 | | 209 | 0.32 | 179 | 33 | 2 | 2 | 1 | 9 | 177 |
| Nash | 230 | 10 | 22 | | 262 | 0.83 | 89 | 160 | 1 | 9 | | | 262 |
| New Hanover | 76 | 6 | 56 | | 138 | 0.75 | 57 | 67 | 3 | 10 | | | 105 |
| Northampton | 1,022 | 126 | 488 | 5 | 1,641 | 3.32 | 777 | 784 | 22 | 20 | 1 | 3 | 1,379 |
| Onslow | 1,001 | 94 | 460 | | 1,555 | 1.87 | 1,000 | 459 | 8 | 54 | 2 | 49 | 1,380 |
| Orange | 369 | 22 | 85 | | 476 | 1.64 | 118 | 222 | 47 | 31 | 3 | 1 | 364 |
| Pamlico | 446 | 16 | 49 | 2 | 513 | 2.36 | 40 | 448 | 11 | 7 | 2 | | 453 |
| Pasquotank | 66 | 7 | 11 | | 84 | 0.80 | 54 | 22 | | 2 | | | 84 |
| Pender | 1,324 | 205 | 938 | 5 | 2,472 | 1.85 | 1,198 | 1,147 | 19 | 52 | 2 | 54 | 1,996 |
| Perquimans | 289 | 17 | 79 | | 385 | 2.47 | 157 | 209 | 1 | 11 | 1 | | 385 |
| Person | 464 | 44 | 154 | | 662 | 2.15 | 255 | 322 | 30 | 38 | 1 | 22 | 554 |
| Pitt | 794 | 61 | 336 | 1 | 1,192 | 2.61 | 195 | 921 | 12 | 20 | 1 | | 1,192 |
| Polk | 104 | 2 | 2 | 1 | 109 | 0.59 | 5 | 90 | 11 | 3 | | 64 | 36 |
| Randolph | 343 | 51 | 105 | | 499 | 0.72 | 45 | 297 | 62 | 90 | | 33 | 451 |
| Richmond | 519 | 48 | 268 | 1 | 836 | 1.47 | 501 | 283 | 18 | 19 | 1 | 95 | 615 |
| Robeson | 312 | 18 | 61 | | 391 | 0.72 | 286 | 87 | 4 | 4 | | | 317 |
| Rockingham | 329 | 23 | 80 | | 432 | 1.09 | 58 | 251 | 55 | 60 | 4 | | 432 |
| Rowan | 277 | 21 | 103 | 2 | 403 | 1.25 | 27 | 262 | 41 | 64 | | 17 | 346 |
| Rutherford | 227 | 3 | 12 | | 242 | 0.57 | 8 | 203 | 15 | 15 | | 30 | 193 |
| Sampson | 568 | 49 | 214 | 1 | 832 | 1.06 | 380 | 418 | 6 | 17 | 1 | | 832 |
| Scotland | 277 | 13 | 38 | | 328 | 1.50 | 263 | 34 | 3 | 23 | | 103 | 203 |
| Stanly | 217 | 34 | 84 | | 335 | 1.32 | 37 | 203 | 30 | 59 | | 11 | 304 |
| Stokes | 98 | 6 | 37 | | 141 | 0.37 | 24 | 77 | 19 | 21 | | 5 | 107 |
| Surry | 116 | 8 | 35 | | 159 | 0.42 | 16 | 115 | 12 | 16 | | | 159 |
| Swain | 5 | | | | 5 | 0.01 | | 2 | | 2 | 1 | 2 | 1 |
| Transylvania | 109 | 2 | 3 | | 114 | 0.33 | 7 | 95 | 6 | 5 | | 86 | 4 |
| Tyrrell | 154 | | 1 | | 155 | 0.62 | 27 | 98 | 19 | 1 | | 8 | 125 |
| Union | 51 | 3 | 9 | | 63 | 0.19 | 11 | 29 | 9 | 13 | | | 63 |
| Vance | 314 | 17 | 60 | 1 | 392 | 2.27 | 163 | 210 | 3 | 11 | 1 | 15 | 309 |
| Wake | 32 | 1 | 5 | | 38 | 0.07 | 11 | 21 | 2 | 2 | 2 | 10 | 27 |
| Warren | 639 | 71 | 326 | | 1,036 | 2.15 | 725 | 276 | 6 | 17 | 1 | 39 | 845 |
| Washington | 173 | 13 | 30 | | 216 | 1.12 | 68 | 118 | 18 | 9 | | 7 | 191 |
| Watauga | 34 | | 1 | | 35 | 0.18 | | 21 | 7 | 7 | | | 33 |
| Wayne | 64 | 1 | 6 | | 71 | 0.26 | 14 | 53 | 2 | 2 | | | 71 |
| Wilkes | 495 | 41 | 115 | | 651 | 0.89 | 14 | 423 | 125 | 86 | 3 | 57 | 512 |
| Wilson | 34 | | | 1 | 35 | 0.22 | 20 | 12 | | | | | 35 |
| Yadkin | 111 | 3 | 7 | | 121 | 0.82 | 8 | 77 | 20 | 15 | 1 | 4 | 111 |
| Yancey | 168 | 16 | 29 | | 213 | 0.65 | 3 | 140 | 22 | 48 | | 96 | 117 |
| **State Total** | 36,711 | 3,635 | 14,370 | 67 | 54,783 | 1.24 | 20,700 | 27,905 | 2,315 | 2,759 | 105 | 3,401 | 46,215 |

[a]Square miles of forest as index of deer habitat.

## 1985-86 Reported Wild Boar Harvest

| County | Male | Female | Total | Game Land | Other Land | Unk. Land | Rifle | Shot-gun | Hand-gun | Unk. Gun |
|---|---|---|---|---|---|---|---|---|---|---|
| Burke | 2 | 2 | 4 | 2 | 2 | | 1 | | 3 | |
| Caldwell | 2 | | 2 | | 2 | | 2 | | | |
| Cherokee | 6 | 8 | 14 | 8 | 6 | | 11 | 2 | 1 | |
| Clay | | 3 | 3 | | | | 2 | | 1 | |
| Graham | 28 | 21 | 49 | 44 | 2 | 3 | 41 | 4 | 1 | 3 |
| Macon | 4 | | 4 | 4 | | | 1 | | 2 | 1 |
| Swain | 1 | 2 | 3 | 2 | 1 | | 3 | | | |
| **Totals** | 43 | 36 | 79 | 63 | 13 | 3 | 61 | 6 | 8 | 4 |

## 1985 Reported Wild Turkey Harvest

| | | Age | | Location | | | Weapon Used | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| County | Turkey Reported | Adult | Juvenile | Game Land | Other Land | Unk. Land | Shotgun | Rifle | Bow | Muzzle Loader | Unk. |
| Alamance | 14 | 13 | 1 | | 14 | | 14 | | | | |
| Alleghany | 21 | 15 | 6 | | 19 | 2 | 16 | 5 | | | |
| Ashe | 44 | 29 | 15 | 2 | 36 | 6 | 36 | 7 | | | 1 |
| Bertie | 36 | 31 | 5 | | 36 | | 36 | | | | |
| Bladen | 1 | 1 | | | 1 | | 1 | | | | |
| Buncombe | 2 | 2 | | 2 | | | 2 | | | | |
| Burke | 2 | 2 | | 2 | | | 2 | | | | |
| Carteret | 2 | 2 | | 2 | | | 2 | | | | |
| Caswell | 133 | 127 | 6 | 24 | 103 | 6 | 125 | 5 | | | 3 |
| Chatham | 14 | 14 | | 5 | 8 | 1 | 11 | | | | 3 |
| Cherokee | 8 | 8 | | 5 | 1 | 2 | 8 | | | | |
| Clay | 10 | 9 | 1 | 9 | 1 | | 10 | | | | |
| Durham | 2 | 2 | | | 1 | 1 | 2 | | | | |
| Franklin | 1 | | 1 | | 1 | | 1 | | | | |
| Graham | 5 | 5 | | 5 | | | 4 | | | 1 | |
| Granville | 7 | 5 | 2 | | 7 | | 7 | | | | |
| Halifax | 9 | 7 | 2 | | 7 | 2 | 9 | | | | |
| Haywood | 1 | 1 | | 1 | | | 1 | | | | |
| Henderson | 5 | 3 | 2 | 5 | | | 5 | | | | |
| Jackson | 0 | | | | | | | | | | |
| Jones | 1 | 1 | | 1 | | | 1 | | | | |
| Macon | 11 | 9 | 2 | 7 | 2 | 2 | 11 | | | | |
| Madison | 8 | 8 | | 4 | 4 | | 8 | | | | |
| Martin | 18 | 18 | | | 16 | 2 | 18 | | | | |
| McDowell | 9 | 9 | | 7 | 2 | | 9 | | | | |
| Montgomery | 14 | 10 | 4 | 4 | 10 | | 14 | | | | |
| Moore | 7 | 6 | 1 | 1 | 6 | | 7 | | | | |
| Northampton | 15 | 15 | | 1 | 11 | 3 | 15 | | | | |
| Onslow | 17 | 13 | 4 | | 17 | | 16 | | | | 1 |
| Orange | 12 | 11 | 1 | | 11 | 1 | 12 | | | | |
| Person | 37 | 36 | 1 | 2 | 34 | 1 | 36 | 1 | | | |
| Richmond | 6 | 6 | | | 6 | | 6 | | | | |
| Rockingham | 8 | 6 | 2 | | 8 | | 8 | | | | |
| Swain | 5 | 5 | | 5 | | | 5 | | | | |
| Transylvania | 14 | 10 | 4 | 11 | | 3 | 12 | 1 | | | 1 |
| Vance | 1 | 1 | | | | 1 | 1 | | | | |
| Wake | 1 | 1 | | | | 1 | 1 | | | | |
| Warren | 3 | 3 | | | 2 | 1 | 3 | | | | |
| Watauga | 1 | 1 | | | 1 | | | | 1 | | |
| Wilkes | 4 | 4 | | 1 | 1 | 2 | 3 | 1 | | | |
| **Totals** | 509 | 449 | 60 | 106 | 366 | 37 | 478 | 20 | 1 | 1 | 9 |

Between 1981 and 1984, the number of TSDs in North Carolina dropped from 323 to 89. Tougher liability insurance requirements and stricter permit guidelines forced many smaller facilities out of the field.

Industries that generate hazardous waste are also seeking ways to reduce their total volume because it's good business. When an industry can reduce, recycle or detoxify its waste product, it saves money. Smaller quantities of waste, or waste that is less toxic, are easier and cheaper to dispose of. Such wastes are also less a threat to the environment.

These two points are the foundation of the state's Pollution Prevention Pays program. This innovative plan, the first of its kind in the nation, seeks to help industry solve its waste problems before they become environmental problems.

"Our goal is to find and apply ways to reduce, recycle and prevent waste before pollution occurs," said Roger Schecter, head of the program for the state's Department of Natural Resources and Community Development. "We provide technical assistance to generators of hazardous waste; serve as an information clearinghouse; support research and education; provide matching fund grants to small businesses, and serve as the lead agency in a cooperative state government effort to reduce waste," he said.

Does pollution prevention really pay? Last year, 39 North Carolina companies saved $12 million, largely by modifying their manufacturing processes to reduce or recover hazardous waste. That's good business, and it's an economic incentive that even the market place understands. More important, the environment is the ultimate beneficiary. Wastes that are recycled, reduced or recovered are less hazardous to the land, water and air we all depend upon for our survival.

The Pollution Prevention Pays idea is a good one, and it seems to have the greatest potential for long-term solutions that industry, government regulators, and environmentalists can all live with. However, despite the promise of the program and its early successes, it can hardly be viewed as a major effort when compared with the magnitude of the problems, or the extent of the government bureaucracy involved. The Governor's Waste Management Board published a "Directory of Federal and State Government Agencies Responsible for Toxic Substance and Hazardous Waste Management" that lists 13 state departments, divisions, boards and commissions, as well as several federal agencies. North Carolina's Pollution Prevention Pays staff consists of two program specialists and a secretary.

That is where we stand today. Where do we need to go?

According to Dr. Linda Little, director of the Governor's Waste Management Board, "I think there's a tremendous need for public understanding of hazardous waste. This involves spills of hazardous materials, not just industrial waste. We have to understand that nothing is free of risk, and most hazardous materials are simply by-products of manufacturing processes."

She also pointed out that we have a serious shortage of hazardous waste treatment facilities, and that public understanding and participation in the siting and approval of such facilities is needed. State law now requires that adequate treatment facilities be available before an approved land disposal facility for hazardous waste can be built.

"We need a good treatment facility that can detoxify and decompose hazardous waste to a less hazardous or inert state, with as much emphasis on recycling and recovering materials as possible," agrees Meyer.

Two waste-treatment facilities are now involved in various stages of the permit process, one in Greensboro and one in Scotland County. If either or both of these facilities receive all the required permits and go into the waste-treatment business, that could open the way for an approved land-disposal facility somewhere in the state. But that opens another can of worms.

"Nobody wants a waste handler in his neighborhood," Meyer said. "But the fact remains that we are producing hazardous materials everyday as part of our modern chemical society. We need the facilities to properly handle them here."

Currently, 96 percent of the waste produced in North Carolina is handled on-site by the generator. The remaining 4 percent is shipped off site to treatment, storage, or disposal facilities, either in-state or out of state. This may sound as though the situation is being handled adequately — and it probably is better than it was six years ago — but the hazardous waste problem still exists. Toxic materials are still being dumped illegally, hidden in the woods and leaking into the soil and ground water from inadequate storage containers.

Fortunately, North Carolina has taken some long strides towards controlling hazardous waste, and eliminating many potential problems. Indeed, some of the most serious immediate problems detailed in our 1980 article have been resolved. The illegal chemical dump site on Kelly Road near Charlotte is a case in point.

In 1980, several hundred drums of hazardous materials such as zylene, acetone and suspected cancer-causing agents such as toluene had been dumped under cover of darkness and covered with dirt. Some of these drums were open and the leaking chemicals had contaminated a small stream and several small ponds. Department of Human Resources personnel investigated, the Attorney General's office prepared legal action, and the firm responsible settled out of court.

The drums of waste were removed to an approved out-of-state disposal facility by the Department of Transportation, and today, the Kelly Road site is largely unrecognizeable from the surrounding neighborhood, although some of the land is being used to dispose of construction debris such as concrete, bricks and lumber. Two ponds have been drained and water samples of an off-site pond show no significant pollution.

Emil Brecklin

***One of the most significant** early victories in the hazardous waste war was the closing of all open, burned landfills.*

Similar results can be reported at the Holly Ridge site where the 3,000 barrels had been stored in an abandoned warehouse. Those barrels have been removed under court order, and a study is underway that officials hope will show the elimination of harmful residues of the chemical.

Despite reason for some optimism, it is still clear however that hazardous waste will continue to be a major problem in North Carolina. In 1980 while interviews were being conducted for that first article, reports of newly discovered dumps, illegally hidden barrels and hazardous waste spills were being recorded almost daily. That situation still exists today, although the physical and legal means to deal with these problems have been improved.

We have better tools today to help us handle the hazardous-waste problem, and waste management has become a big business. The question that remains is whether that business will be successful.

# Fairylands Of Ferns

*Ferns may appear to be fragile, but they are actually among our oldest plants, tracing their lineage back 300 million years.*

*written and photographed by Harry Ellis*

***Spore clusters** of the silvery glade fern (*Asplenioides thelypteriodes*) grow on the undersides of the fern's leaves. In the fall, dry conditions will prompt the expulsion of hundreds of thousands of minute spores, from which the new generation of ferns will grow.*

***The lacy spinulose woodfern** (*Dryopteris intermedia*) is one of the most common of our woodland ferns.*

In every human there seems to be an inborn appreciation of beauty in one form or another, and for most people this would certainly encompass our native ferns in all their many forms and varieties. In structural beauty of leaf and form, they are unsurpassed, with the same symmetry of organization we see in a snowflake. During the past few decades, there has been an aroused interest in the study of ferns. There is an American Fern Society with 2,000 members, all highly dedicated to this branch of science—pteridology.

Unlike the flowering plants, that run into many thousands of different kinds, less than 400 species of ferns and fern allies are found on the American continent north of Mexico, and usually not more than 60 or so in any given locality. So it is not difficult to know them all, as there are many fine field guides and identification manuals available for most regions.

Ferns are the highest group among the flowerless plants, those that bear neither flowers nor seeds but reproduce by means of spores, which in ferns are produced in tiny cases underneath the leaves or on special branches. The shape and arrangement of these spore clusters, or sori as they are called, are very diagnostic as to the identification of the species. Unlike a seed, which is a true embryo with all the cells needed for the development of a plant, a fern spore is incapable of producing a complete plant by itself. When ripe, the dustlike spores are scattered by the wind, and of many thousands set free by each plant only a few germinate and grow into inconspicuous, quarter-inch gametophytes that lie flat on the ground like little green leaves, each bearing both egg and sperm cells. Through a film of rain or dew, the sperm must swim like polliwogs to the eggs for fertilization. From this union, a tiny, new fern is born.

The state of North Carolina is justly proud of its native ferns. Though many species occur abundantly throughout the whole state, it is in the mountains, especially the Great Smokies and the Blue Ridge,

# *Fairylands Of Ferns*

that they reach the height of development, both as to the number of species and the abundance of individuals. These rolling mountain ranges, richly arrayed with ferns and other forms of vegetation, are biologically and ecologically unique throughout North America and the entire world.

More than any other form of plant life, the ferns and their allies — the horsetails and clubmosses — represent our geological past, reminding us of the vast expanses of time. They arose some 300 million years ago as the mighty fern forests of the Carboniferous Age, where over much of the earth's surface they formed dense jungles of giant ferns that grew almost 50 feet high, horsetails or Equisetums 30 feet tall, and Lycopods or clubmosses that towered as high as our tallest trees. In this strange and eerie world, animal life also flourished and grew to monstrous size. Huge amphibians scrambled on short legs through the muddy swamps. There were dragonflies with wingspreads of nearly 3 feet, and giant spiders and scorpions of almost unbelievable size. It was a time, just before the rise of the great dinosaurs, when life was somehow urged to gigantic proportions by forces or circumstances that we know nothing about. This much we know: a great surge of life, both plant and animal, swept across the entire earth.

Over this tropical, nightmare world hung a heavy silence, for as yet there were no birds to sing, no cries of mammals, no human voices to break the stillness. And there was not a flower in all the forest to brighten the landscape or shed its fragrance.

There were immense climbing ferns as well as many of the smaller ones like those of today. When we look at a fern we see a form that is not only older than most of the hills but has come down to us largely unchanged, for fossil fern imprints have been found in seams of coal almost identical to our living forms.

In those forests of long ago grew a few seed ferns, the first plants to produce true seeds. As time flowed serenely by over many millions of years, the climate changed from warm to cold. When a breath of the Arctic blew down over this sweltering jungle of life, the mighty forests fell, were buried, crushed and fossilized into the coal beds and oil deposits that today fuel our industries and heat our homes.

After a reign of some 50 million years, all the great fern forests, the giant clubmosses, horsetails and scouring rushes had vanished into the lost years of geologic time. The seed ferns also disappeared from the fossil record, but before they perished they had given rise to a new and different flora. The Age of Ferns had ended, but a new day had dawned. The Age of Flowering Plants had begun. Never again would ferns be the dominant plant form on earth, but, dwarfed in size, would henceforth thrive chiefly in the shade of the seed-bearing trees. Here, amid singing birds and scurrying mammals, they would forever enrich the forest shadows with their haunting beauty.

Each year when spring comes and all life awakens with a rush, new ferns push up through the rich, black loam in tightly rolled spirals called "fiddleheads," each curiously shaped like the neck of a violin. In Christmas and cinnamon ferns, these crosiers are wrapped in coatings of silvery wool, which slough off as they unroll. The new fronds expand and grow until whole woodlands are clothed in draperies of green. And almost always, intermingling with the green waves of ferns, growing among the clumps and clusters, are wildflowers of many kinds and colors, variegated carpets of orange and yellow, red and pink, or purple, blue and white, in scenes of natural and artistic beauty.

***The cinnamon fern*** *(*Osmunda cinnamomea*) is one of the most widespread of all ferns, flourishing along lakes and rivers, in swamps and other damp environments.*

The stately cinnamon fern (*Osmunda cinnamomea*) is certainly one of our finest, growing 5 feet tall in arching, circular clusters with a spore-bearing, cinnamon-colored spike rising in the center of the circle. It is abundant in low, moist woods, along streams and in swampy areas throughout our state from the mountains to the Coastal Plain. On the other hand, the woodferns are found chiefly in our western highlands. In fact, many of our highest mountains are crowned with lush growths of mountain woodfern (*Dryopteris campyloptera*) and spinulose woodfern (*Dryopteris intermedia*). Tall and

***Mountain spleenwort*** *(*Asplenium montanum*) is a common fern in upland environments. These spleenworts, photographed in Linville Gorge, covered every ledge.*

***Fiddleheads*** *are characteristic of all fern species. The new leaves sprout in tight coils that look like the scroll of a violin, hence the name. As the leaf grows, it uncoils until the full leaf is revealed. These Christmas fern fiddleheads are growing amidst false hellebore.*

# *Fairylands Of Ferns*

***The climbing fern*** (Lygodium palmatum) *has an unusual shape and acts like a vine, twining over twigs and up trees almost like ivy. This fern grows in moist or wet soil and in shade.*

***The walking fern*** (Camptosorus rhizophyllus) *is another fern with a unique shape. It walks by sprouting a new plant wherever a leaf tip touches the ground. The fern grows on mossy rocks or cliffs, or in crevices.*

***Growing from a crevice*** *in a granite cliff, polypody* (Polypodium virginianum) *is a fern species that favors rocky places. It grows in mats, completely covering the rock from which it springs.*

lacy, they grow under canopies of red spruce and Fraser fir, in association with lady fern, and a ground cover of mountain wood sorrel and shining club-moss. Largest and handsomest of the group is the rare Goldie's woodfern (*Dryopteris goldiana*), rich golden-green in color, up to 4-feet high and a foot wide.

Of all our ferns, for sheer beauty I would pick the maidenhair fern (*Adiantum pedatum*). Hidden deep in a Blue Ridge ravine there is a waterfall, nameless and not spectacular as waterfalls go; yet growing in a wide radius around it and completely covering the ground, are dense growths of maidenhair fern, their delicate fronds forever trembling in the mist and spray of the waterfall. Here, from time to time, in this world of perpetual shade, slippery, red salamanders dart through the dripping greenery of the ferns.

The Christmas fern (*Polystichum acrostichoides*), with dark, leathery, evergreen fronds, adds its beauty to the woods, both summer and winter. Likewise, another evergreen fern, the polopody (*Polypodium virginianum*) crowns many otherwise bare Appalachian cliffs and boulders with attractive mantles of green.

Perhaps the most unique and unusual of all our ferns is the walking fern (*Camptosorus rhizophyllus*). It has arrow-shaped leaves tapering to long, slender tips that take root when a tip touches the damp humus of the limestone outcrops on which it grows. A new plant arises, grows to maturity and the process is repeated. Thus it "walks."

The mountain spleenwort (*Asplenium montanum*) hangs in drooping clusters from shaded cliffs in our mountains. In the Linville Gorge Wilderness Area, this small, lacy fern grows in such profusion that it sometimes covers every available cliff and ledge along sections of Linville River. The maidenhair spleenwort (*Asplenium trichomanes*), rare and local in the mountains, is a beauty. In narrow crevices of dripping rock, its roots somehow find a foothold, where it grows in attractive rosettes on the wet surface.

There are hay-scented ferns (*Dennstaedtia punctilobula*), with the smell of new-mown hay, and climbing ferns (*Lygodium palmatum*), looking more like trailing vines than ferns. Also, there are glade ferns, beech ferns, rattlesnake ferns, fragile ferns and many more, all an important and valuable part of our wild, native flora.

Because many of their natural habitats have been destroyed by the clearing of forests, draining of marshes, and the spreading of towns and highways, many of our select ferns are in a very precarious position. Some of our finest have already disappeared from their old haunts. Our treasured woodlands are not only growths of trees. They represent all of the ferns, all the wildflowers and all the animal life within their borders, comprising a whole, fragile ecosystem. When the trees and their shade are gone, so go all the rest.

There was once, in a cup of green hills, not many miles from my home, a forest where I loved to walk. Here, all nature appeared in harmonious balance. In spring, under towering trees of beech and maple, oak and hickory, delicate ferns and wildflowers spread their carpets, squirrels raced through the trees and birds sang and nested in their branches. A crystal-clear stream ran through it, with a picturesque waterfall known as Emma's Falls. The whole area was locally known as Falls Hollow. Once, within a quarter-mile radius of the waterfall, my friend, Carter Hudgins, and I, counted 20 species of ferns.

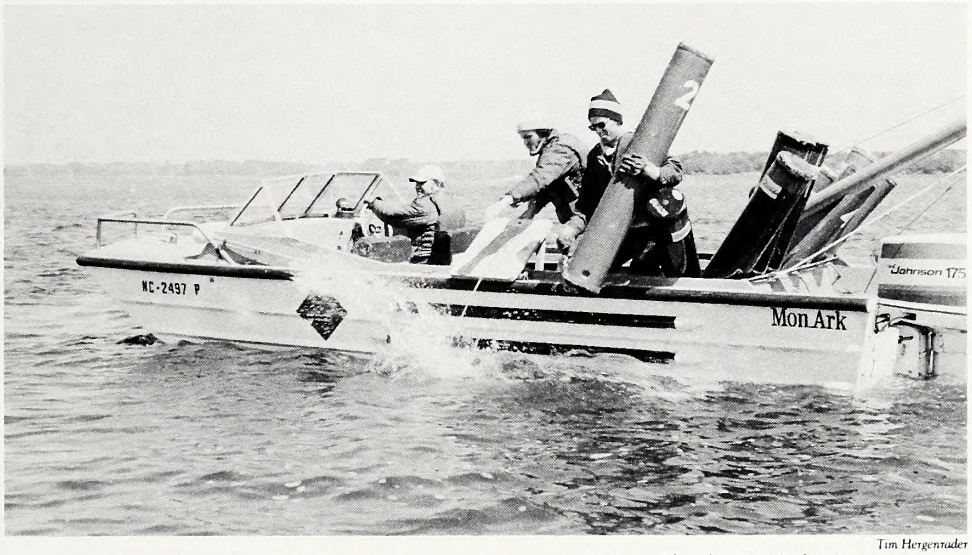
But, alas, three or four years ago, the bulldozers came and built roads, followed by power-saws and logging trucks. Today, where once birds sang and ferns trembled in the shadows, there is only a tangle of fallen brush, low-growing weeds and bushes, deep gullies and erosion, with no singing birds, no flowers, and no ferns. At least half a century will be required for a possible succession and rebirth of this forest.

***The purple-stemmed** cliff-brake (*Pellaea atropurpurea*) grows from limestone cliffs. This rare fern seems to flourish in almost soilless habitats.*

With the coming of fall, all the ferns, except for a few evergreen varieties, react to the same phenomenon as the trees above them by losing their green chlorophyll masks and taking on colors of bronze and yellow-gold. Along the Blue Ridge Parkway, I have seen large areas, acres wide, of hay-scented ferns and cinnamon ferns thus transformed by autumn's touch.

The fern hunter is never quite sure just what he will find growing in the next valley, on the next ridge or the next shaded cliff that he explores. Certainly, no one would expect to find in our mountains, such a rarity as the hart's-tongue fern, the rarest and most sought-after of American ferns. The chances are a million to one against it, but who knows? Anything is possible, and it just might be that this seclusive fern, or some other renowned rarity, is hiding in a shady, unexplored glen of the Great Smokies or the Blue Ridge. It is the charm of the unpredictable that makes fern-hunting the exciting adventure that it is. There are yet discoveries waiting to be made.⊠

# Land Of Many Boats




Tim Hergenrader

***Markers warning of hazards*** *or no-wake zones are placed by the Wildlife Commission.*

Boating is one of North Carolina's most popular outdoor pursuits, and Wildlife Commission programs are making it easier and safer.

by Mike Overton

North Carolina boaters have never had it so good. Our rivers and sounds have traditionally provided boaters with ample opportunities to try out their skills, but even for a state not blessed with natural lakes we're doing pretty well. The U.S. Fish and Wildlife Service recently ranked the state 17th in the nation in the number and area of reservoirs. With the completion of Falls Lake and B. Everett Jordan Reservoir, North Carolina had 43 reservoirs larger than 500 acres, and totalling 217,000 acres. In 1969, by comparison, the state had 21 reservoirs totalling 162,500 acres.

Most communities today are within a short driving distance of major lakes and rivers. These opportunities combined with a rapidly growing and increasingly prosperous population have brought people out on the water in unprecedented numbers. According to the National Marine Manufacturers Association, North Carolina's motorboat and sailboat sales in 1985 totalled nearly $70 million compared with $30 million in 1980! Motors, trailers and marine accessories also brought in another $50 million for Tar Heel boat retailers in 1984. Virtually all of these annual expenditures are related to recreation, and it's growing rapidly.

The soaring boating population has placed more demands on the Wildlife Resources Commission, which licenses most boats and is in charge of many boating programs, from getting the boater into the water to educating him about boater safety. In 1985, the Commission licensed 218,000 boaters, up from 122,519 in 1975, an increase that also reflects the recent licensing of sailboats.

The Commission's popular boating-access program has kept pace with this expanded use of state waters. The Commission has constructed a total of 148 areas to provide free public access to the waters of North Carolina. It also maintains and improves these sites by constructing new boarding docks, launching ramps, bulkheads, and by adding night security lights. Boating technicians keep areas clean and usable for the public on a monthly basis.

The first boating access-area was built in Weldon in 1952. The second area was built in Kitty Hawk. After these first two areas were built, the Commission continued to build access areas throughout the state, reaching a total of 50 in 1959, 80 in 1964 and 148 in 1986.

The North Carolina Wildlife Resources Commission plans to build three additional sites in the near future. These sites will be located on Rices Creek in Brunswick County, Cedar Island in Carteret County and the Cashie River in Bertie County.

As the number of boaters increases on

***Boating has become*** *one of North Carolina's most popular outdoor sports, and boats range from small fishing craft like this one to rigs more expensive than a home.*

# Rules Of The Road

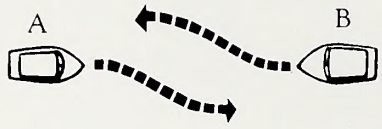
The "rules of the road" on our waterways should be considered important when you consider that there are no marked lanes or boundaries for boaters. However, the "rules of the road" for boaters are similar to the rules used for highways found in various highway traffic laws and can be simplified into four phrases: Keep Right, Give Right, Big is Right and Nobody is Right.

**Keep Right** - When approaching another vessel head on, each vessel must change its course to starboard (right) to avoid a collision.

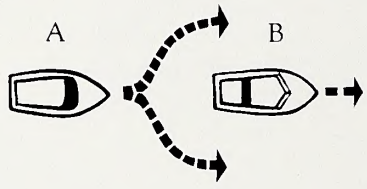
**Give Right** - When two vessels are on a course where their paths will cross, the vessel having the other vessel on its starboard side (right) must give right of way to the vessel on the right.

**Big is Right** - There are times when the larger vessel, because of its size, has the right of way. An example of this would be when a large freighter may be going through a channel where its movement is restricted. Regardless of the rules, the larger vessel will have the right of way over the smaller vessel.

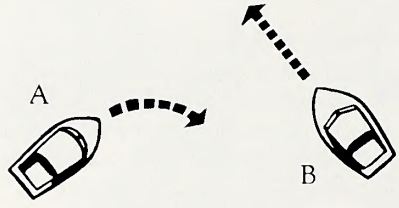
**Nobody is Right** - The operator of any vessel has the responsibility to take action needed to prevent a collision. There will be times you might clearly have the right of way according to regulations; however, it is your responsibility to take the necessary actions to avoid a collision.




A and B blow one blast and alter course to starboard.




Any vessel overtaking another must keep clear. A gives one blast to pass on right and two blasts to pass on left.



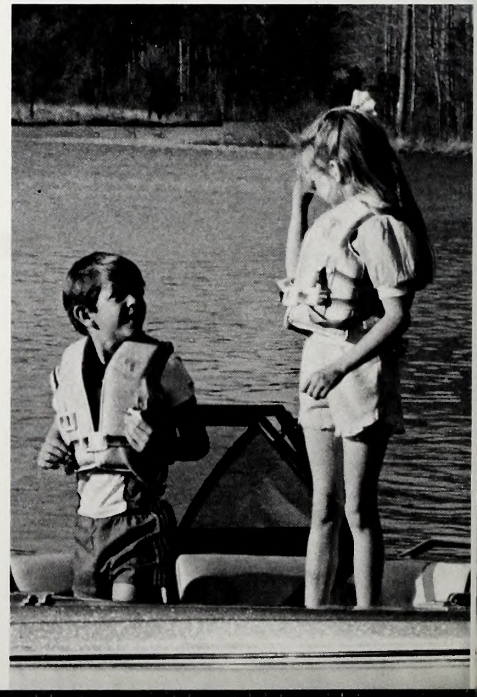

Two vessels crossing — the vessel that has the other on its own starboard side keeps clear.

Jim Dean

state waters, predictably the accidents increase. During the past three years, for example, there were 340 boating accidents, resulting in 105 fatalities and 166 personal injury cases. Property damage from these accidents totaled $1,142,526 in losses.

Enforcing the boating laws is one way the Commission tries to maintain boating safety on state waters. The Commission also promotes boating safety through its boating education program in the schools. The Boating Education Course was introduced during the 1974-1975 school year. During that year, 25,000 books were distributed statewide, but an additional 25,000 were ordered later that year because the course was so popular. Since then, 815,000 students in public and private schools in every county of the state have completed the Wildlife Commission's Boating Education Course. It has been ranked first in the nation since it began, and has maintained that lofty ranking.

The Boating Education Course is designed to reach young people before they develop poor boating habits. The course consists of two parts. Part I is a programmed lesson plan in which the student teaches himself about boating. Each student learns the types of boats, their capacity, parts of a boat, why a boat floats, and what would cause it to sink. Also learned are reasons for falls overboard, weather signs to watch, the use and importance of personal-flotation



***Brad and Amanda Perkinson** of Wake Forest know it's essential to wear their life vests when they're boating with their parents.*

***While fishing draws** the biggest number of boats to North Carolina's lakes, water skiing and sailing are rapidly growing in popularity.*

devices, boat registration procedures, boat fires and explosions, water-skiing safety, rules for running lights, navigational aids and the actual operating of the boat.

In Part II the student is given a slide quiz based directly on the information learned in Part I. After satisfactorily completing the course, each student is given a certificate of completion. The course is designed for a minimum of six hours of study. After a student completes this course, he or she will have obtained basic knowledge of boating leading to safer and more enjoyable boating for the student and other boaters.

Wildlife enforcement officers work very closely with school systems and will furnish schools with materials and instructions upon request. If your school system is not presently providing the boating course to your students and you are interested in obtaining information about the course for your school, contact the N.C. Wildlife Resources Commission by calling toll free 1-800-662-7137, or write: Division of Enforcement, N.C. Wildlife Resources Commission, Archdale Building, 512 North Salisbury Street, Raleigh, NC 27611. A wildlife safety officer will contact you shortly to explain the use of the course.

The Wildlife Commission also has water-safety teams throughout the state to demonstrate why lives are lost each year in water-related accidents and how many of these accidents could be avoided. The teams demonstrate the correct use of personal flotation devices, danger situations, the use of clothing to stay afloat, loading equipment and people into a boat, unsafe movement in a boat, the checking of safety equipment, how to approach docks, towing, skiing, and the loading of a boat on a trailer.

The water-safety teams are available for demonstrations, and are immensely popular and entertaining, as well as instructive. Persons or groups wishing a demonstration should call toll-free 1-800-662-7137 in Raleigh.

North Carolina has never been better for a boater with a skiff, bass boat, sailboat or offshore sportfisherman. There are a lot of wide open spaces on our waters across the state. The Wildlife Commission is not only helping to keep them safe, but also making sure you can launch a boat and enjoy it. ⊠

*Population Destroyed By Cold Winter*

## Stocking Offers Hope For White Perch In Lake Phelps

*Written and Edited by Mark Taylor*

Lake Phelps was known for its excellent white perch fishing in the 1970s, and it wasn't unusual for anglers to catch fish weighing up to 1½ pounds. An unusual winter destroyed the white perch population, however, and Wildlife Commission fisheries biologists are now trying to restore this popular fishery.

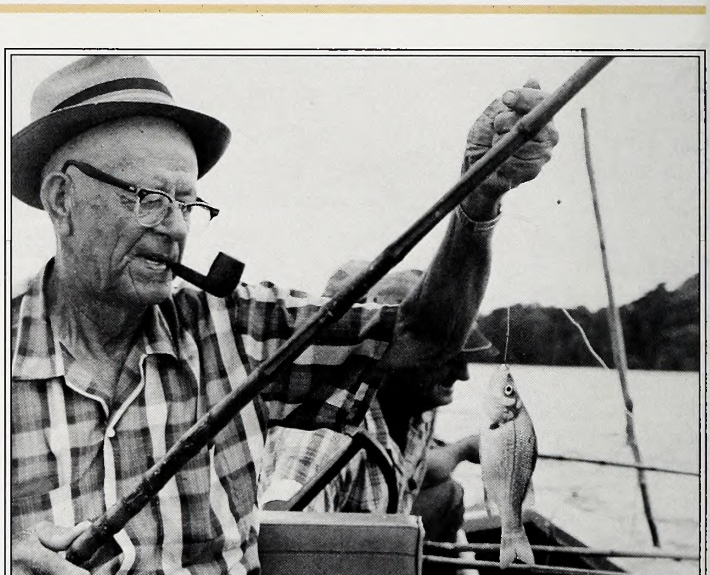
"The winter of 1980 was unusually cold, and the lake froze over for a couple of weeks," said Pete Kornegay of Elizabeth City, District One fisheries biologist. "When the ice melted, all the white perch were dead and literally covered the bottom of the lake. It was very strange because no other fish died. When we conducted our annual trawl samples in the lake for the next two summers, we found no white perch whatsoever."

In the absence of the white perch, the lake's yellow perch population soon expanded to fill the vacant ecological niche. "We now have a classic, stunted, yellow perch population," said Kornegay. "The lake is full of yellow perch that are all about 3 inches long."

The first attempts to restore the fishery began in 1983 when 300 adult white perch were released. "We were hoping these fish would spawn and repopulate the lake. If the fish did spawn, however, the eggs and fry must have been eaten almost immediately by yellow perch. Our trawl samples for the next couple of years turned up no juvenile or adult white perch."

Biologists are now taking a different tack. This spring, they collected adult white perch from pound nets on the Chowan River with the help of local commercial fishermen. These brood fish were taken to the Commission's Fayetteville fish hatchery where they were induced to spawn. The eggs and fry will be raised to fingerling size and released in Lake Phelps later this summer.

"We're breaking some new ground with this project," said Kornegay. "As far as we know, no one has raised white perch to fingerling size before. But, it shouldn't be much different from raising striped bass in a hatchery. We'll hold these fingerlings until they're too big for the yellow perch to eat, and this should give them a chance when they're released. We're planning to release about 30,000 fingerlings a year for the next three years, and hopefully this will reestablish this fine game fish."



Jack Dermid

***Better Days Ahead:*** *Lake Phelps was once known for its fine white perch fishing. Exceptionally cold weather wiped out the fish, but the Wildlife Commission hopes to restablish the population through a three-year stocking program.*

*Plenty Of Spawning Habitat*

## Fishing Spring Runs Doesn't Hurt Fontana Walleyes

One of our readers expressed concern about the effects that fishing spring walleye runs on the Little Tennessee River might have on walleye populations after this popular fishery was featured in an article in the March 1986 issue of *Wildlife In North Carolina*. Mallory Martin, District 9 fisheries biologist for the Wildlife Commission, believes that fishing the spawning run will not harm walleye populations.

"The Little Tennessee River is not the only spawning area available to Fontana walleyes," explained Martin. "Both the Nantahala and Tuckaseegee rivers provide spawning habitat, and there are significant walleye runs in each of these rivers. Lake James, on the other hand, offers limited spawning habitat for walleyes in the Linville River. Therefore, there are restrictions on walleye fishing in Linville River during the spawning season.

"Walleye are also prolific spawners. As is true with many self-sustaining populations, there is an allowable surplus of adult fish which can be harvested without detriment to the populations. Our studies show that the Fontana walleye population is relatively stable in spite of the harvest of adult walleye during the spring runs. Moreover, a majority of the fish caught during spawnings are the smaller males which are less critical to maintaining the population than the egg-bearing females.

"At the present time, we do not feel that the angling harvest of Fontana walleyes is affecting the population in any negative way. Other factors, such as forage availability and habitat suitability, probably restrict the Fontana walleye population to a much greater degree. We realize that walleye are an important fishery resource in North Carolina, and will continue to protect and enhance our walleye populations in the future."

*Assistant Director, Fisheries Chief Named*

## Commission Promotions Announced

Richard B. Hamilton of Raleigh has been appointed assistant director of the North Carolina Wildlife Resources Commission. This post was left vacant when Charles Fullwood was appointed executive director of the agency earlier.

Hamilton, who was chief of the agency's Division of Boating and Inland Fisheries, has been replaced by Fred Harris of Apex. Harris served as assistant chief of the Division and supervised the Division's research, survey, and regulations programs.

Hamilton began his career with the Wildlife Commission in 1970 as a wildlife biologist in the then Division of Game. He has served as chief of the Division of Game, assistant director of the agency, and chief of the Division of Boating and Inland Fisheries.

Harris began working for the Commission in 1972 as a fisheries biologist in Siler City. In 1976, he was appointed fisheries research coordinator for the Piedmont region, and in 1981 he was promoted to assistant chief of the Division of Inland Fisheries.

"We're pleased to announce these promotions," said Charles Fullwood, executive director of the N.C. Wildlife Resources Commission. "Richard Hamilton and Fred Harris have excellent work experience, and we have confidence that they'll do a fine job."

*June 1-7 Slated*

## Observe National Safe Boating Week

Kay Frazier

***A Fine Way To Spend A Day:*** *National Safe Boating Week is being observed from June 1-7, and one of the best things that boaters can do is to take a boating education course. Information on organizations offering courses may be obtained by calling 1-800-336-BOAT.*

*Good Spots Highlighted*

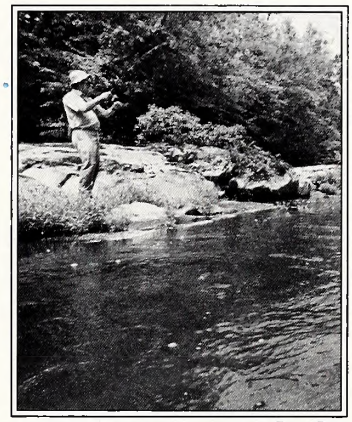
## Piedmont Fishing Promoted

Are you looking for a place to fish in the Piedmont? The Wildlife Commission's Division of Boating and Inland Fisheries recently published two booklets that offer a wealth of information. They are entitled *City Lake Fishing in the Central Piedmont* and *Stream Fishing in the Central Piedmont*. The booklets were written by Roger Jones of Burlington, District 5 fisheries biologist.

*City Lake Fishing in the Central Piedmont* profiles the area's many municipal water supply lakes and their fisheries. These lakes offer good fishing for largemouth bass, striped bass hybrids which are stocked by the Wildlife Commission, crappie, and bream. Information on access, permits, and facilities is included.

*Stream Fishing in the Central Piedmont* offers information on a fishery that few anglers utilize—the region's large number of warmwater streams. These streams are often undeveloped, and offer good fishing for largemouth bass, jack, crappie, bluegills, and other sunfishes. Wading and fishing these streams with ultralight tackle and spinners is especially effective. Information on access points is included.

Single copies of these brochures are available free from the Division of Boating and Inland Fisheries, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.



Duane Raver

***Cool and Green and Shady:*** *Many small streams in the Piedmont offer excellent fishing on a hot summer day.*

*Only If They're Fried*

## Bass Fingers?

Summer means fishing to most North Carolinians, and one of the best parts is eating the catch. This recipe for "fried bass fingers" comes from Mrs. Jackie Musselwhite of Wilmington. The recipe would work equally well with catfish, and makes a great snack on a summer evening.

**Fried Bass Fingers**

*bass filets*
*seafood breader*

Cut filets from bass into finger-sized strips. Roll or shake the fish strips in seafood breader, and fry until brown in deep, hot oil.

## Field Notes

Trout Season—Open. No closed season on all other fish species. See regulations digest for creel and length limits.

Sportsmen are reminded that all annual fishing and hunting licenses expire on June 30, 1986.

*Trailer May Be Inadequate*

## Towing Boat Safely Requires Care

Are you planning to tow your boat to the lake or ocean anytime soon? If so, be sure you're properly equipped. Boating safety, like many other things, begins at home.

"Many boaters practice safety on the water, but neglect it when they trailer their boats," said Colonel Winfield Rhyne, chief of the Division of Enforcement of the Wildlife Commission. "Yet, an accident that occurs when towing a boat is potentially very dangerous. Many boaters will spend thousands of dollars for a state-of-the-art fishing boat, but will skimp on the trailer and hitch. This is a serious mistake."

With this in mind, Rhyne offers the following tips on safe trailering:

- Be sure that the trailer meets all the legal safety requirements for use on public highways. If your boat and trailer exceed a certain weight, trailer brakes may be required. If you have any questions, contact the N.C. Division of Motor Vehicles.
- Be sure that the boat fits the trailer. Check the weight rating of the trailer, and see that the boat (including motor and gear) is within the safety rating.
- Match the coupler on the trailer tongue to the ball of the hitch. The size of the ball is determined by the gross vehicle weight rating, and this information has been stamped on the tongues of all trailers manufactured since 1973.
- Replace winch lines made of fiber and synthetic rope with steel cable if your boat is longer than 16 feet or is unusually heavy.
- Place jack and caster assemblies on heavy trailer tongues. This eases hookup of the trailer, and prevents back injuries.
- Use tie-downs from the trailer to the bow and stern of the boat, and inspect them frequently for wear and rot.
- Match the tires with the load capacity of the trailer, and make sure they are in good condition. Don't forget to carry a spare and a jack.
- Install wheel-bearing protectors on all trailers and check them regularly. These devices hold grease under pressure, and prevent water from entering the wheel bearings.
- Affix safety chains permanently to the trailer, and cross them under the hitch so that they will catch and hold the trailer tongue if the ball should fail. Remember to attach the chains to the towing vehicle at points separate from the ball or the bracket that holds the ball.
- Be sure that your hitch matches both the towing vehicle and loaded trailer, and have the hitch installed professionally. The day of the so-called "bumper hitch" is just about over because most bumpers made today are too weak to handle the weight of all but the lightest boats.
- Drive carefully—don't forget you're towing a few thousand pounds of boat and trailer behind you. Slow down, and allow more room to stop. Nothing can be more terrifying, or deadly, than a boat and trailer that have parted company from a vehicle at highway speeds.

*Deadline For Orders June 30*

## Last Chance For Sportsman's Prints

***Catch Of A Lifetime:*** *Wildlife artist Duane Raver captured a moment every fisherman dreams of—a big largemouth hitting a surface plug—on the 1986 North Carolina Sportsman's stamp.*

*Orders for limited-edition, art prints of this stamp will be taken through June 30, 1986. For more information, write PRINTS, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.*

*Print prices range from $90 to $125 and stamp prices range from $7.50 to $9.50.*

## Writer Explores Atlantic Graveyard

*Shipwrecks—Diving The Graveyard of the Atlantic* by Roderick M. Farb. 257 pp., softcover. $12.95 in area bookstores. Published by Menasha Ridge Press, Rt. 3, Box 450, Hillsborough, NC 27278.

The winter of 1942 was a grim time for Allied shipping. Hitler's U-boats stalked the shipping lanes leading into Norfolk, and the sight of burning tankers and oil-soaked beaches brought the distant war home to residents of North Carolina's Outer Banks. From January through April of 1942, German submarines sank 67 tankers and freighters in North Carolina waters—known universally to merchant sailers as "torpedo alley."

Today, these wrecks and many others offer superb fishing and diving, and it's easy to forget the terrible price paid by the American and British seamen who lost their lives for democracy. Robert Farb brings their stories alive in his superb book *Shipwrecks—Diving The Graveyard of the Atlantic.*

This book is intended to be primarily a diver's guide. Wrecks are broken down by region, and include pertinent diving data such as water depth, clarity, bearings, and distance from the nearest port. However, a brief description of each wreck gives a history of the ship and how it met its fate. Black and white photographs also illustrate the text, and there are special sections on Civil War wrecks, 19th-century wrecks, underwater photography, and services for divers.

Divers will find this book invaluable. However, anyone who is interested in North Carolina's maritime history will also find it interesting.

*Bluebird Boxes Erected*

## Army Looking For A Few Good Bluebirds

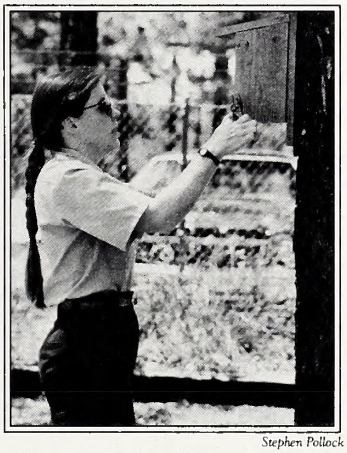
A bluebird is a beautiful sight, and unfortunately these colorful songbirds are much less common than they were in the past. A wildlife biologist at Fort Bragg, however, is working to make sure that bluebirds will lift spirits at the base in the years ahead.

"The program is fairly simple," said Laura Buchanan, Fort Bragg wildlife biologist who is conducting the project. "We simply erect bluebird boxes on trees or posts wherever we notice bluebird activity. Then, we monitor the boxes to see if they're being used. If they're not, we move them to other areas where there is more bluebird activity."

This is the first time that bluebird work has been done at Fort Bragg on a large scale. "About two years ago, a retired gentleman volunteered to put up some bluebird boxes at the Officer's Club golf course," she said. "Right now, we're just trying to find proper locations for permanent boxes. Bluebirds begin nesting in April, and if a box does not get used we can simply try another location where it may be used the following year."

Locations for bluebird boxes have to be chosen carefully, however, because the boxes are potential death traps. "Squirrels will sometimes chew through the fronts of the boxes, enlarging the entrances so they can get inside. Then, they destroy the eggs and nest and use the box as a den. We have to avoid areas with squirrel populations. Feral cats are also dangerous to bluebirds and their young. In some cases, we put cone-shaped metal guards around the trees or posts so they can't climb up to the boxes."

Another problem is competition from other songbirds. "Starlings and sparrows both nest in cavities, and these birds often oust bluebirds from their natural nests. These birds are slightly larger and more aggressive than bluebirds. The boxes are designed to prevent this, however. The entrance hole is just big enough for a bluebird, but too small for the average starling. Also, the boxes don't have perches favored by sparrows."



Stephen Pollock

***Housing Starts Up:*** *Laura Buchanan, a wildlife biologist at Fort Bragg, is attempting to increase the base bluebird population by erecting nesting boxes.*

Buchanan hopes that the measures being taken by the Fort Bragg Fish and Wildlife Branch will rebuild the bluebird population, and make the sight of a bluebird a common thing in the future.

*—Stephen Pollock, Fort Bragg Military Reservation*

*New Youth-Fishing Program*

## Bass Federation Boosts CATCH

Tar Heel youngsters will find it a little easier to learn how to fish thanks to the North Carolina Bass Federation. This organization of bass fishing clubs recently donated $500 to CATCH (Carolina Anglers Teach Children How), a youth-fishing program conducted by the Wildlife Commission. Membership in CATCH is open to all youngsters from ages eight to 15, and members receive a quarterly CATCH Newsletter, membership cards and patches, and the opportunity to participate in free CATCH fishing clinics held across the state.

"We greatly appreciate this donation from the N.C. Bass Federation," said Debbie Paul, chief of the Youth Activities and Environmental Quality Section of the N.C. Wildlife Resources Commission. "This donation not only helps support the program financially, but also is an investment in the future of fishing. We also appreciate all the help that members of the Bass Federation have provided at our fishing clinics."

Information and applications for the CATCH program are available from CATCH, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.

## The Wildlife Endowment Fund Report

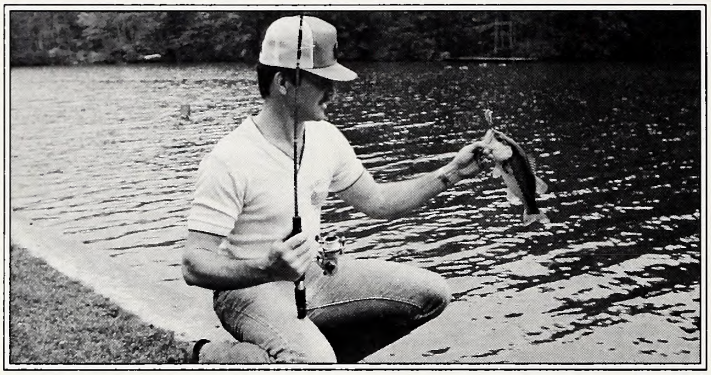
The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

**Status on February 28, 1986**

| | Numbers Sold | Revenue Received |
|---|---|---|
| Lifetime Sportsman's License | 16,285 | $4,924,862.24 |
| Lifetime Hunting License | 132 | 26,014.75 |
| Lifetime Fishing License | 1,005 | 179,297.81 |
| Lifetime Subscriptions to Wildlife in N.C. | 683 | 82,132.60 |
| Contributions | — | 68,782.10 |
| | Fund Total: | $5,281,089.50 |

*Check Yours*

## Some Licenses Expire June 30



Terry Shankle

***Check Your Wallet:*** *Fishing is a fine way to spend your time, but if you look closely at your license you'll see it expires on June 30. The best deal for serious outdoorsmen is a lifetime fishing and hunting or lifetime sportsman's license. Application blanks are available from license agents or from the License Section, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, NC 27611.*

## Calendar Of Events

**June 7-8**
Spring Gathering of Small Wooden Boats at the North Carolina Mariners Museum in Beaufort. Competition for best traditional boats, races, and educational activities. For more information contact the North Carolina Mariners Museum, 315 Front St., Beaufort, NC 28516.

**June 8-14**
27th Annual Invitational Blue Marlin Team Tournament. Sponsored by the Hatteras Marlin Club, Box 218, Hatteras, NC 27943.

**June 13-14**
North Carolina Blue Crab Derby and Festival at Morehead City. Crab race, crafts, entertainment and a crab banquet.

**June 14**
14th annual Rogallo Kite Festival at Jockey's Ridge State Park in Nags Head. Competition for homebuilt and stunt kites.

**June 14**
"Maritime Bath" at the Bath State Historic Site. Focuses on the significance of Bath as a colonial port.

**June 15-20**
N.C. State University Sport Fishing School at Hatteras. Classes and trips focus on inshore and offshore fishing. For more information contact Alice Strickland, N.C.S.U. Division of Lifelong Education, Box 7410, Raleigh, NC 27695.

**June 21**
Wanchese Seafood Festival and Blessing of the Fleet at Wanchese. Focuses on traditional and non-traditional local seafood.

**June 30-July 4**
Cap'n Fannie's Billfish Tournament at Atlantic Beach. For more information contact the Anchorage Marina, P.O. Box 7, Atlantic Beach, NC 28512.



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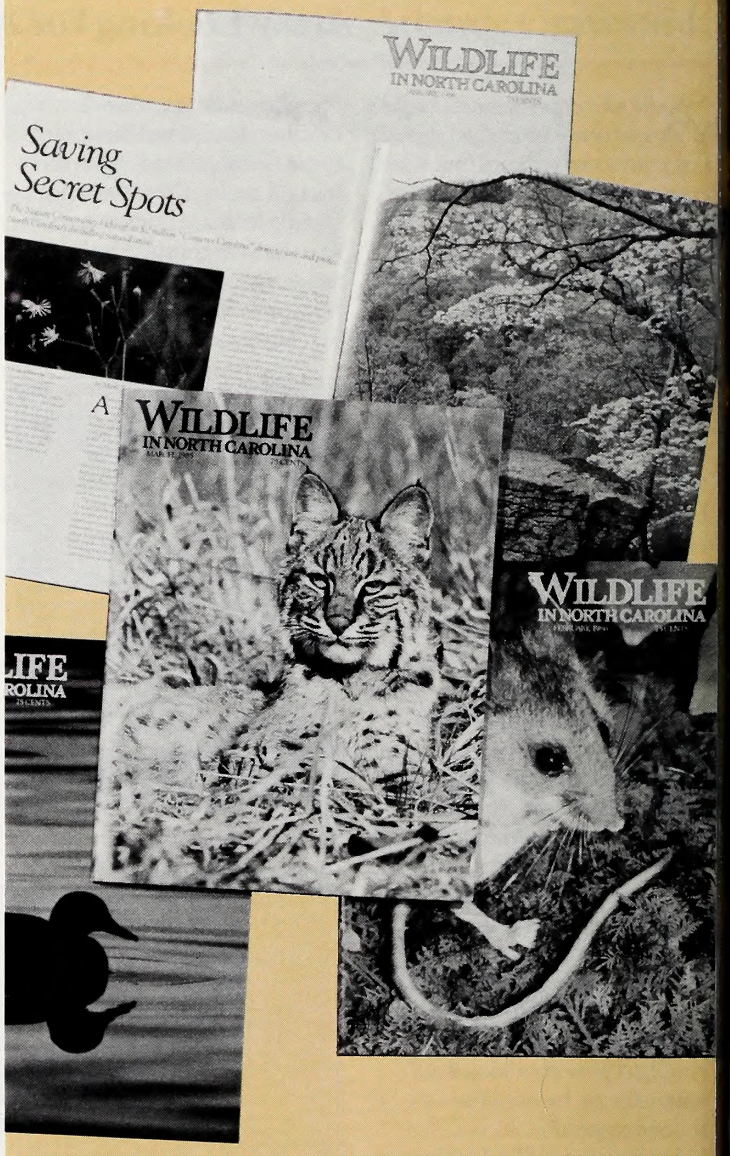


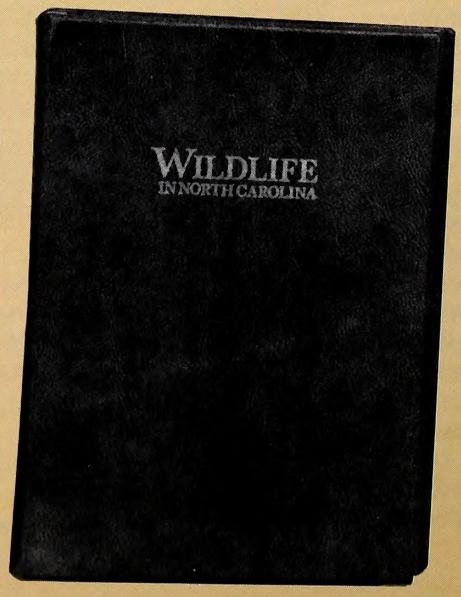

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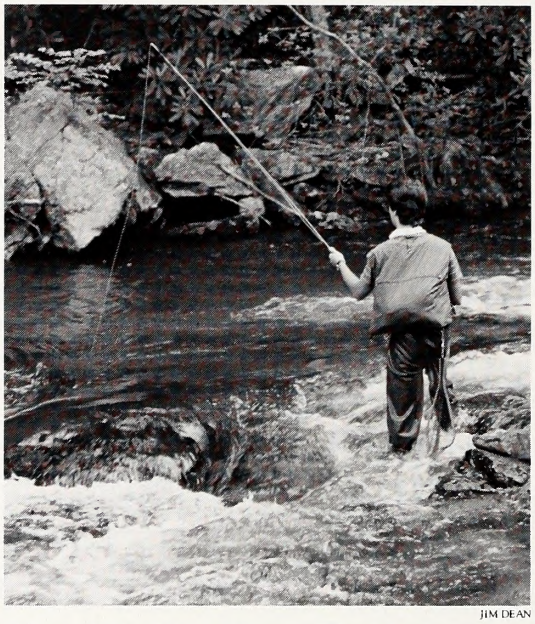
# WILDLIFE IN NORTH CAROLINA

JULY, 1986 75 CENTS

# Fishing For Ice Age Trout

*by Jim Dean*

If this seems more like a letter than a column, I can explain. As I begin, it appears that I'll be finishing it around midnight. In a day of wrapping up odds and ends before a vacation, it was one of the odds that didn't get ended. Shortly before daylight in the morning, my son Scott and I will drop this off at the office and head west. Five hours later I'll take off my watch and put it in the glove compartment. Then, I'll turn up the single-lane dirt road that climbs over what locals call the staircase. When we drop into the valley on the far side, we'll be home.



JIM DEAN

I've been coming to these remote mountains for about 25 years to fish for trout, explore the ancient trails and taste a sense of history. In some parts of these hills, you can move in and out of the last century by simply taking the right road, entering an old church or buying a Cheerwine in a village grocery.

The tiny cabin I stay in was built out of timbers strewn down the gorge by the 1916 floods. The furniture—a bed, chair and table—was made by an old man who built what he and his neighbors needed with a water-driven saw. If you needed a bedroom suite, you brought him a picture out of Sears & Roebuck and he'd start looking for the right tree to cut. Resting on the rafters of his shop was a handsome walnut coffin he made for himself years before he died—kept his likker in it, they said, although I find it hard to believe he kept any whiskey around long enough to store it. He died in the '60s, and his abandoned house finally fell in a few years ago. Last year, Scott and I found what was left of his "A" Model rusting away in a thick clump of rhododendron. Today, it's hard to imagine how he ever got it up the steep 2-mile trail to the Forest Service road.

I guess I don't need to tell you that I love this part of the state, and I have spent my share of spare time fishing its trout streams. Years ago, in that first flush of discovery when the soul is possessed by salmonoids, my fellow anglers and I would leave Raleigh in the middle of the night, arrive at dawn and fish until dark, then drive five hours back home and work the next day. There was literally no price we wouldn't pay for an hour on a trout stream, and that kind of obsession is so rich and wonderful that you feel obliged to try to share it with your children.

Of course, you can't really transfer an obsession, and especially not from parent to child. There is a natural barrier that seems to ensure that few, if any, offspring will acquire the identical interests of their fathers and mothers. Indeed, children are far more likely to gravitate to an opposite extreme, driven perhaps only to express their own identity. Given that general rule, you'd probably expect any offspring of mine to be mathematicians living in a metropolitan penthouse and reading only fashion magazines and TV Guide. Okay, so I exaggerate a little.

Actually, in a selfish way, I've been luckier than most. My kids have their own obsessions—which is as it should be—but they also like to share mine.

So it is that this afternoon Scott and I will park the car, string up our flyrods and stick peanut butter and jelly sandwiches in our vests. Then, we'll begin to walk. The first mile along this particular creek has a fading trail, but above the falls, the trail peters out and you have to stay in the creek or climb high up the steep banks to the ridge line above the thick laurel "hells" to find enough room to walk.

We'll worry about the lack of a trail later. Meanwhile, we'll begin to fish this tiny tributary above the falls and stay in the creek until it's little more than a trickle. We may catch 20 to 30 trout apiece, but it's unlikely that any will be longer than about 8 inches.

These are brook trout, remnants of the ice ages, and the only native gamefish in these remote headwaters. Both the brown and rainbow trout are latecomers, first stocked in North Carolina streams in the late 1800s. Indeed, even the native brookie is a char rather than a trout.

That alone makes them special, but there is more to it than that. These trout can exist only in the purest environment where water temperatures average 55 to 65 degrees Fahrenheit. Today, such conditions exist largely in the small headwaters of some—not all—streams. Thus, to me the brook trout is yet another link with this region's history—clinging somewhat precariously to an existence that seems too fragile to last.

For Scott and me, fishing this kind of water is at least as much ritual as it is pure fun. The fish are tiny jewels of dark mottled green with pale blue spots touched lightly in the center with scarlet. Their fins are flags of black, red and white. Getting to these fish is the only difficult part. Catching them is easy, and they're also good to eat, although we never keep any.

In a wistful way, all of this is connected. It is the pleasure of fishing with a son, a sharing of history and the visceral gratification of using a skill. But is is also the satisfaction of knowing that an appreciation for all of this is being passed to at least one more generation. It is, after all, the only protection any of us can afford to the things we have cared about.

If our children do not have an opportunity to learn the value of such things, they will have no incentive to protect them and pass them on to their own children. It may be the best inheritance we can leave, and having said that, I'm on my way west. In five hours, we'll be catching brookies and passing the torch.

July, 1986
Volume 50, Number 7

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# WILDLIFE IN NORTH CAROLINA

*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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**Back Of The Book** *by Mark Taylor*

**Cover** *A newly born white-tailed deer fawn rests quietly in a mountain glade in the Smokies. Well camouflaged, motionless and without scent, it should escape harm from predators until it is able to run. Photography by George Humphries.*

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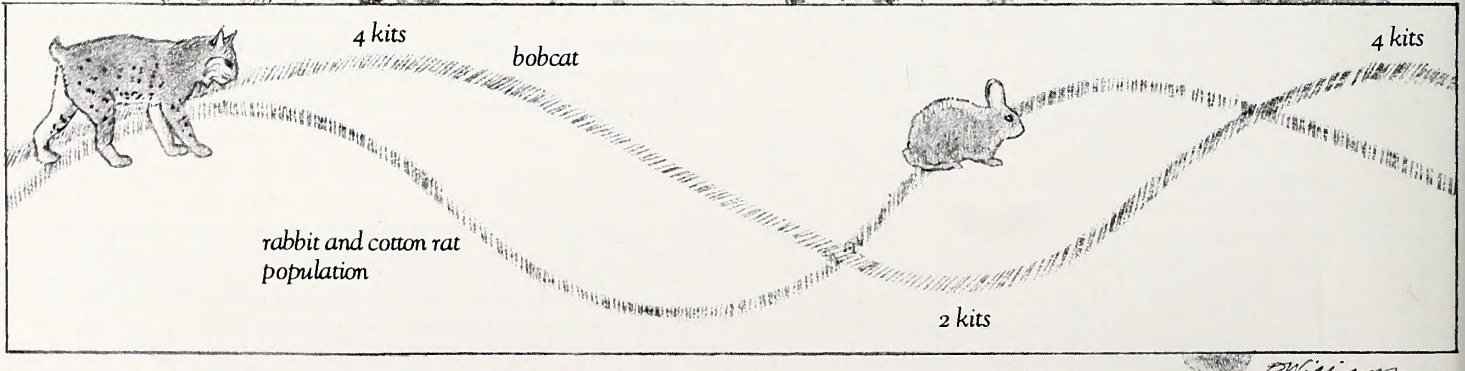
**Each animal has** *a clutch or litter size that is characteristic of its species. Some birds produce as many as 20 eggs, while birds of another species lay no more than two. Fish and amphibians tend to flood the environment with huge numbers of young, and then abandon them. Birds and mammals have far fewer young and care for them over time. The family size of each species is a number evolved over time to ensure the most young surviving to adulthood.*




**Bobcats produce** *from two to four kits each year, depending, among other things, on the availability of rabbits and cotton rats which are the bobcat's main food supply. The graph shows that as the prey population increases, bobcat mothers tend to have larger families. But as the rabbits decline in numbers, bobcat populations also decline because of starvation and disease. Bobcat mothers will now produce smaller families because of poor nutrition.*

| Species | Family Size | Breedings per year |
|---|---|---|
| *Bald eagle* | 1-2 | 1 |
| *Mourning dove* | 2 | 2 or 3 |
| *Anhinga* | 3-5 | 1 |
| *Blackbird* | 3-5 | 1 |
| *Heron* | 4-5 | 2 |
| *Warbler* | 4-7 | 2 |
| *Gallinule* | 6-8 | 1 |
| *Mallard* | 10-15 | 1 |
| *Quail* | 12-20 | 1 |
| *Salamander* | 16-39 | 1 |
| *Alligator* | about 30 | 1 |
| *Spring peeper* | about 900 | 1 |
| *Black bear* | 1-2 | 1/24 mos. |
| *Deer* | 1-2 | 1 |
| *Flying squirrel* | 1-6 | 1 or 2 |
| *Mouse* | 1-7 | 1 to 4 |
| *Raccoon* | 2-5 | 1 |
| *Gray squirrel* | 2-5 | 1 or 2 |
| *Beaver* | 3-4 | 1 |
| *Cottontail rabbit* | 3-5 | 1-7 |
| *Chipmunk* | 4-5 | 2 |

***The litter or** clutch sizes of many animals vary between upper and lower limits, depending on several factors including food supply. Above, a selection of animals, their family sizes, and the number of times they breed a year.*

# The Riddle Of Family Size

*written by Lawrence S. Earley / illustrated by David Williams*

A white-tailed deer normally has two fawns per year, although in some years it may only produce one or even none. A flying squirrel gives birth to two or three young at a time; a beaver, three or four; a chipmunk, four or five.

Many dissimilarities also characterize the family sizes of birds. A pigeon invariably lays two eggs several times a year. A mourning dove also lays two at a time, but a bobwhite quail will brood 12 to 20 eggs. The records for young, however, are held by fish and insects which produce prodigious quantities of young. A single bluegill lays 4,000 to 5,000 eggs while a codfish sows the ocean with over 60 million. A queen termite can lay nearly 150,000 eggs a day!

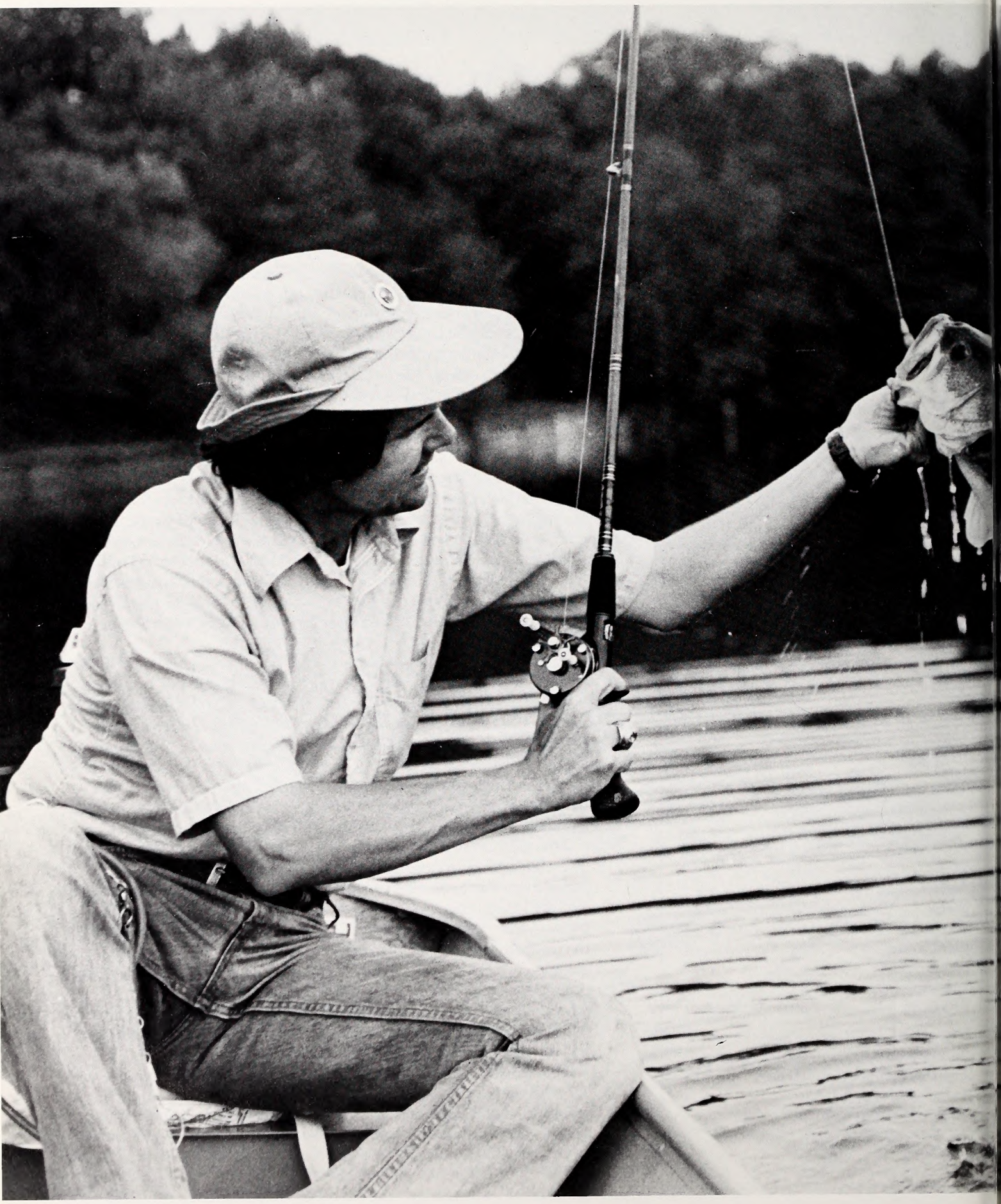
Why does a robin have three or four young at a time and not 10 to 15 like a mallard? The question is even more intriguing when it is pointed out that birds, at least, are capable of producing many more young than they actually do. If you take an egg from a nest each time it is laid, the bird will continue to lay more than the normal clutch size.

One explanation for the constant or nearly constant family size of an animal species is that it represents the largest number of young that the parents can adequately nourish at one time. It is a number, evolved through time, that assures the most young that will survive into adulthood. In other words, if the robin laid 10 eggs and could incubate them (the ability to cover eggs during incubation is one limit on a bird's clutch size), the nestlings would most likely be undernourished and many would fail to survive.

The clutch or litter size, then, is part of the genetic inheritance in the species. But animals also have the ability to vary the number of young between upper and lower limits, depending on certain conditions. Whitetails produce two fawns normally, but only one when food supplies are poor. In birds the variations are also caused by the food supply, and how it affects the mother's nutrition, and by other factors such as the size and age of the mother (smaller and older moms have smaller broods), whether she's breeding for the first time (first broods are smaller), and the season of the year (early broods are smaller).

The question of clutch or litter size is an important one for biologists investigating how animal numbers are regulated. Although animal populations can experience explosive growth — 120 starlings introduced into the United States in 1890 have resulted in the millions we have today — they rarely do. Instead, populations generally stabilize. What is the mechanism by which this stability is achieved? The answers to this question have been controversial. Some biologists say that as an animal population increases, the resulting crowding inhibits the local reproductive rate and population growth is curbed. Others maintain that litter and clutch sizes being fairly constant, it is disease, predation and starvation that combine to whittle down the population.

The size of the family is critical to the ability of a wildlife species to survive. Even among species that flood the environment with their young, leaving them to fend for themselves, we have to believe that the number they produce has been established for a reason. Does a single codfish need to lay 60 million eggs? Yes, just as a robin needs to lay three or four eggs. The number is sufficient to ensure that enough codfish grow to maturity, and to bring red breasts to green lawns in spring.



CURTIS WOOTEN

# *Fishing Our* PIEDMONT LAKES

## There's lots of good fishing in dozens of big lakes throughout North Carolina's mid-section, and these tips should help you find it.

by Jim Dean

Two stories. Both are about fishing trips on some of the huge impoundments in North Carolina's Piedmont mid-section. Both accounts are also true, but it would probably be stretching it a bit to say that the first one is typical.

Just before daylight one June morning a few years ago, two of us left a boat ramp along Lake Gaston's south shore and traveled several miles to a spot my companion knew about. Although it was virtually in the middle of a huge expanse of water, the peak of a submerged hill rose within a few feet of the surface. Without a depth finder, you'd never know it was there, and in fact, you could pass a few feet on either side of it with the depth finder running and never get a reading of less than 40 feet.

"I just happened to run right over the top of it one day and see it flash on the depth-finder," said my companion. "Even though I've managed to pinpoint it by triangulation, it still takes me awhile to relocate it every time I come here. If you ever tell anybody where it is, I'll have you shot."

Quite frankly, I would richly deserve it. Indeed, for all you know I may be lying about the name of the lake, but never mind. The point is that during the first two hours of daylight that morning, he and I used weighted plastic worms to catch two limits of largemouth bass ranging from 2½ to 6½ pounds, and most of the fish were in the 4- to 5-pound class. We released all but two or three we planned to eat. I've never had a better day of bass fishing on a big lake.

Alas, the second tale is far more typical of impoundment fishing. In fact, I could pick just about any big lake in the Piedmont I've ever fished and simply tell you what I caught on the majority of my trips. Zilch. Zero. Nothing. Just two weeks before I sat down to write this, I spent an entire day from daylight to dark fishing one of the Piedmont's most renowned bass lakes. Two of us were in a fully equipped bass boat with two depth-finders and a full array of tackle. Both of us tried every trick we knew. Neither had so much as a single strike. All the fishermen we encountered were experiencing a similar lack of success, and some of them knew the lake far better than we did.

Fishermen who spend a lot of time fishing major lakes in North Carolina's Piedmont should have little trouble identifying with such widely differing success stories. The fact is that even on the very hottest lakes, there are plenty of days when fishing is lousy. There are also less frequent days when it can be truly exceptional. Even so, it is no secret that big lake fishing has had a major impact on fishing in this state in recent years.

Less than 20 years ago, the most popular gamefish in North Carolina was the bluegill. It was strictly no contest. Largemouth bass and crappie ranked well behind the popular "bream." Today, however, bass and crappie have replaced bluegills as favorite species.

There are several possible reasons, the foremost perhaps being the construction of many massive impoundments in the Piedmont. There are more big lakes to fish, and that's where a lot of fishermen are trying their luck. The development of fast, comfortable fishing boats and lots of high-tech gear has also played a role. Let's face it, fishermen have always liked innovative gear to play with, and today's anglers have better and more expensive toys than ever before. Most of this gear — especially a bass boat — is designed for big water, and if you've put a second mortgage on the homestead to buy and equip a boat, you're going to use it on large lakes.

Over the years, I've about come to the

***A 5-pound largemouth bass** is a prize in most Piedmont lakes, especially with increased fishing pressure, but there are ways you can improve the odds in your favor.*

## Fishing In Piedmont Lakes

| Species | Best Lakes* | Times To Fish | Tactics |
|---|---|---|---|
| Largemouth bass | Badin, Blewett Falls, Brandt, Cammack, Falls of Neuse, Farmer, Gaston, Harris, High Rock, Jordan, Kerr (John H.), Michie, Mountain Island, Norman, Oak Hollow, Reese, Reidsville, Roanoke Rapids, Tar River (Reservoir), Thom-A-Lex, Tillery, Townsend, Tuckertown, Wylie | year-round but best in March-May and September-November | Casting to shoreline and points and to backs of coves; fish structures and weed beds |
| Striped bass | Badin, Gaston, Kerr, Norman, Roanoke Rapids | year-round but best in March-May | jigging, trolling, and casting; especially good in tail races behind dams** |
| Striped bass hybrids | Cammack, Jordan, Oak Hollow, Thom-A-Lex, Townsend | year-round but best in March-June and September-November | jigging, trolling, and casting |
| White bass | Badin, High Rock, Tillery, Tuckertown, Wylie | year-round but best in spring and fall | trolling and casting in tailraces; during summer and fall, fish in deep water at night using lights to attract fish |
| Bluegill | Badin, Blewett Falls, High Rock, Tillery, Tuckertown, Wylie | March-June, and September-October | fish along shorelines |
| Redear sunfish (shellcracker) | Quaker Creek (Lake), Tillery, Wylie | March-June, and September-October | fish along shoreline and off points |
| Crappie | Badin, Blewett Falls, Brandt, Falls of Neuse, High Rock, Gaston, Jordan, Kerr (John H.), Reese, Roanoke Rapids, Thom-A-Lex, Tillery, Tuckertown, Wylie | March-May | fish around submerged brush, trees, and structures |
| White perch | Badin, Holt (Lake Butner), Roanoke Rapids, Tillery | year-round but best in spring and fall | casting and trolling; during summer and fall, fish in deep water at night using lights to attract fish |
| Channel catfish | Badin, Blewett Falls, Gaston, Higgins, High Rock, Michie, Oak Hollow, Quaker Creek (Lake), Roanoke Rapids, Tar River (Reservoir), Tillery, Townsend, Tuckertown, Wylie | June-October | fish on bottom in coves |
| Flathead catfish | Badin, Blewett Falls, Tuckertown | April-May, and July-September | Fish in tailraces during the spring; during the summer, locate deep holes and fish on the bottom |

*Lakes are listed alphabetically only. No attempt has been made to "rank" their importance.
**Extreme caution should be exercised when fishing any tailrace! Rapid changes in discharge rates from the dam can create hazardous conditions instantly.

conclusion that the more money you spend on a boat, the fewer fish you're going to catch. That may not be entirely true, but if you simply wanted to catch a lot of fish, spend very little money and avoid all the crowds, you'd probably fish ponds. However, since a lot of us — me included — still like the challenge of fishing big lakes, it makes sense to maximize your chances of success. Fortunately, there are several things you can do.

One thing you can't do is totally escape the crowds. The fishing pressure is intense on some of these lakes, especially on the newer ones with "hot" reputations. Personally, I think a lot of fishermen expect too much from such "hot" or newly built lakes that are going through their boom years. Sure, the fishing can be great at times, but the pressure is so great that the fish get smart pretty quick and it is unrealistic to expect to slay 'em. Still, if you're determined to fish the boom lakes, plan your trips during the week rather than the weekend if possible.

Another good idea is to let the crowds have the boom lakes and plan your trip to other older lakes in the same area. Some of these have been all but abandoned as anglers flock to the new spots. Look at it this way, wouldn't you rather be the first boat to fish a shoreline or bit of deep structure in an older lake than the 10th boat to fish those same areas in a new lake?

There are some other tips you may want to consider. It probably goes without saying, but be sure to pick a lake that has a pretty good reputation for producing the fish you want to catch. The chart accompanying this article can give you some basic guidance on this. Still, it won't do you much good to try to regularly fish a lake that's 200 miles from your home.

That brings us to one of the best tips. Pick out a lake near where you live and stick to it

| Lures Or Baits |
| --- |
| plastic worms, spinnerbaits, plugs, live minnows |
| live shad/minnows, cut bait, large jigs, and plugs |
| jigs, spoons, spinnerbaits, cut bait |
| jigs, spinners and small live shad |
| ultralight spinners, flyrod popping bugs and sinking flies, crickets, worms, and small minnows |
| worms and crickets, sinking flies such as black ants, nymphs |
| live minnows, and ultralight jigs and spinners |
| spinners, jigs, and cut bait |
| live minnows/shad, worms, cut bait, stinkbaits |
| live fish/shad |

through thick or thin until you've learned how to fish it under varying conditions and seasons. You'll almost always catch more fish on a lake that's familiar to you than you will on a strange lake — even if the strange lake has a better reputation. It takes a lot of time on a big lake to locate the best shorelines, points, dropoffs and submerged

JIM DEAN

***Crappies rank second** in popularity behind bass among North Carolina fishermen, and stringers of "speckles" this size and larger are fairly common on Piedmont lakes.*

JIM DEAN

***North Carolina's** big Piedmont lakes have contributed to increased sales of fast, comfortable bass boats especially designed to fish larger waters.*

cover, but until you've accumulated that information and learned how and when to fish specific areas, you can't expect much.

Consider Jordan and Falls lakes. Both are relatively new and going through their boom years. A couple of years ago, bass fishermen were catching up to 100 small bass a day along the shorelines. But as bass begin to mature, they aren't as easy to fool, and they also tend to seek out types of cover other than shorelines. Unless you just plain get lucky, it'll take more time to find the good spots now, and you'll have to change your tactics, too.

It also pays to be a bit more opportunistic. For example, I've fished some of these lakes on days when the bass fishing was poor. Yet, all around me crappie fishermen were pulling in big slabs left and right. If I had any sense, I'd carry some minnows or ultra-light spinning gear and jigs and switch to crappies when the bass aren't biting. If neither bass nor crappies cooperate, it may be time to try something else. Relatively speaking, bluegills and shellcrackers are not getting the fishing pressure that crappies and bass are getting on the big lakes. If you're willing to switch to worms or crickets — or a flyrod or ultra-light spinning reel — you can often turn a losing day into a winner by catching a bunch of panfish.

On big lakes, especially, it pays to keep your options open and be ready to switch tactics. Bass and crappie fishermen

## Location Of Piedmont Lakes

| Lake | County(ies) |
|---|---|
| Badin | Stanly, Montgomery |
| Blewett Falls | Anson, Richmond |
| Brandt | Guilford |
| Cammack | Alamance |
| Falls of Neuse | Wake |
| Farmer | Caswell |
| Gaston | Halifax, Northampton, Warren |
| Harris | Wake |
| Higgins | Guilford |
| High Rock | Davidson, Rowan |
| Holt (Butner) | Granville |
| Jordan | Chatham |
| Kerr (John H.) | Vance, Warren |
| Michie | Durham |
| Mountain Island | Gaston, Mecklenburg |
| Norman | Catawba, Iredell, Lincoln, Mecklenburg |
| Oak Hollow | Guilford |
| Quaker Creek (Lake) | Alamance |
| Reese | Randolph |
| Reidsville | Rockingham |
| Roanoke Rapids | Halifax, Northampton |
| Tar River (Reservoir) | Nash |
| Thom-A-Lex | Davidson |
| Tillery | Montgomery, Stanly |
| Townsend | Guilford |
| Tuckertown | Davidson, Montgomery, Stanly |
| Wylie | Gaston, Mecklenburg |

*Lakes are listed alphabetically only. No attempt has been made to "rank" their importance.

**Extreme caution should be exercised when fishing any tailrace! Rapid changes in discharge rates from the dam can create hazardous conditions instantly.

JIM DEAN

***Flyfishermen can use*** *these homemade "whisker worms" to make good catches along shorelines and in coves.*

occasionally run into schools of white bass, stripers, or hybrids on some lakes, and if you've got the right lures and tackle, you can take advantage of those opportunities. Last year, two of us accidentally caught a nice white bass while we were drifting across the mouth of a cove plugging for largemouths. We quickly switched to light spinning tackle, tied on some smaller spoons and spinnerbaits and enjoyed 30 minutes of fast action.

There's another tip that's worth considering. Many fishermen, if not most fishermen, will arrive at a lake in mid-morning or after lunch and expend most of their angling energy fishing during the poorest part of the day. Even if they stay and fish until dark, they may be fishing areas that have been pounded hard all day. Besides, if you've already been casting for several hours, chances are pretty good that you're getting tired or a bit bored and you may not fish as well. The answer is to start early.

From spring well into late fall, by far the best time to fish is from first light until about 9 a.m. Sure, it's not a lot of fun to get up at 4 o'clock in the morning — or earlier — in order to be fishing by dawn, but if you are truly serious about catching fish, that's often the price you have to pay. This is especially true for largemouth bass. Not only are the bass more active early in the morning, they are more likely to be in relatively shallow water along the banks. They're usually in a feeding mood, and you may get the first shot at them that day.

No doubt about it, fishing the big lakes of the Piedmont can sometimes be a frustrating experience. But you'll catch more fish if you can manage to avoid the most crowded situations by fishing in mid-week or picking less popular lakes. Also, stick to one or two lakes until you learn them, be willing to switch tactics when necessary, and concentrate your fishing in the early morning hours.

Actually, those are pretty good tactics even if you're fishing smaller municipal lakes or ponds. And that's the final tip. If all else fails, park the big boat in the backyard and find yourself a good farm pond. An afternoon watching a cork and listening to a cage of chirping crickets is sure to restore your spirit. You'll catch some fish, too. Guaranteed! ⊠

# What's The Deal At Jordan Lake?

## A biologist explains the continuing cycle at a "boom" lake, and why fishermen may need to change their tactics to catch maturing bass, crappies and other species.

by Roger Jones

In 1983 and 1984, B. Everett Jordan Reservoir was considered by most Tar Heel anglers to be the hottest bass lake in the state. But in 1985, the hot bass'n reputation took a nose dive. Why?

The story really begins in the fall of 1984, when the phones in the N.C. Wildlife Resources Commission's Division of Boating and Inland Fisheries office started ringing repeatedly with angler complaints about declining bass catches. In early 1985, dead bass were observed floating along the lake's shoreline and the phones really began to buzz. The next call went to the fisheries biologist in charge of Lake Jordan — that's me. My first thought was, "How could this be happening here on a new lake with a developing fishery? Will the controversy surrounding this lake ever die?" For those of you not familiar with the controversy that has surrounded this lake over the years (even before it was built), let me quickly review some history.

During the late 1940s, the U.S. Army Corps of Engineers proposed construction of a lake on the Haw River with the dam site near the Haw's confluence with New Hope Creek in Chatham County. The purpose of the impoundment was to reduce flooding downstream. However, this proposed project caused a stir among landowners and conservationists that flourished for nearly three decades. Major objections to building the reservoir stemmed from landowner property loss (some land had belonged to some families for generations) and from the destruction of alluvial bottomland (prime farming and wildlife habitat). As time passed, concerns were also voiced over the potential for water-quality problems and the loss of the famous white-water canoeing and rafting stretch on the Haw River below N.C. 64.

***Electro-shocking*** *temporarily stuns fish which are released after they're checked. Biologists are using this gear to study Jordan Lake bass populations.*

By 1974, the dam site had been completed on the Haw River, but for the next three or four years, the project was operated as a dry dam because of continuing legal entanglements. During this time, legal action forced the Corps to perform environmental impact studies on the proposed impoundment. The studies tended to confirm that water quality would indeed be a problem in the lake, as predicted, with the lake eutrophication from heavy phosphorus loads predicted to be the major culprit. In light of this, the Wildlife Commission recommended that the lake not be impounded and presented this view as a "friend of the court" brief to the courts in 1977. The Wildlife Commission was also concerned about the loss of some of the finest remaining bottomland wildlife habitat in the Piedmont. The issue finally came to rest in Federal court in July 1977 when the injunction to prevent impoundment was

lifted permitting the lake to be completed.

Contractors then started clearing 14,000 acres of bottomland and the project was scheduled to be completed by April 1978. However, highway construction and bridge relocations along with unexpected dam repairs delayed permanent reservoir filling until September 1981. During this time, the Wildlife Commission assisted the Corps with the review and development of a recreational master plan for the reservoir. That plan included boat launching access, fishing reefs, fish stocking and wildlife subimpoundments for waterfowl hunting.

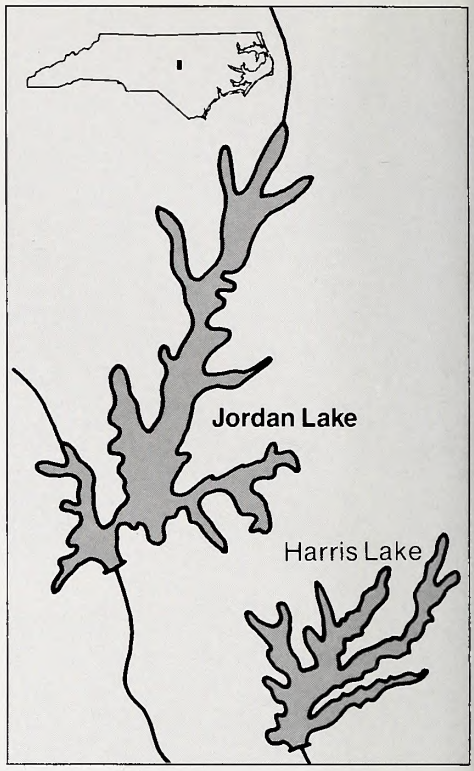
During the past several years, boat-launching facilities have been constructed at the North Carolina Park Headquarters off N.C. 64 (west of Wilsonville), and the Parks Ebenezer and Vista Point landings off S.R. 1008 (south) and S.R. 1700 (south), respectively. Launching access is now also available at Crosswinds Marina (privately operated) and the Wildlife Commission's Farrington access areas, both of which are located north of Wilsonville off S.R. 1008. In addition, the Corps provides boating access near the dam at the Poe's Ridge Landing off S.R. 1931 via S.R. 1012 (south).

In 1980, several sites were selected in the reservoir for placement of artificial fish reefs. These fish reefs were constructed of automobile tires (500-1000 tires per reef) by the Corps and placed at appropriate sites. This type of cover, along with over 220 acres of standing timber (marked by fisheries biologists), was designed to offer excellent fishing sites.

Since 1982, over 1 million fish have been stocked in Jordan Lake by the Commission's Fayetteville Hatchery personnel with the majority of these fish reared at the McKinney Lake National Fish Hatchery. Considering all this, one could conclude that Jordan Lake is extremely fertile with abundant forage and excellent cover. Furthermore, with so many largemouth bass stocked to add to the bass already present in New Hope Creek and Haw River, the lake should be a bassing paradise. So you can imagine why I might be a bit surprised at the complaints and continuing controversy.

The complaints about bass fishing were fairly common in 1985, and I heard a wide range of them. "I can't catch any large bass —the lake's fished out," some said. "Too many people and too much fishing pressure,"

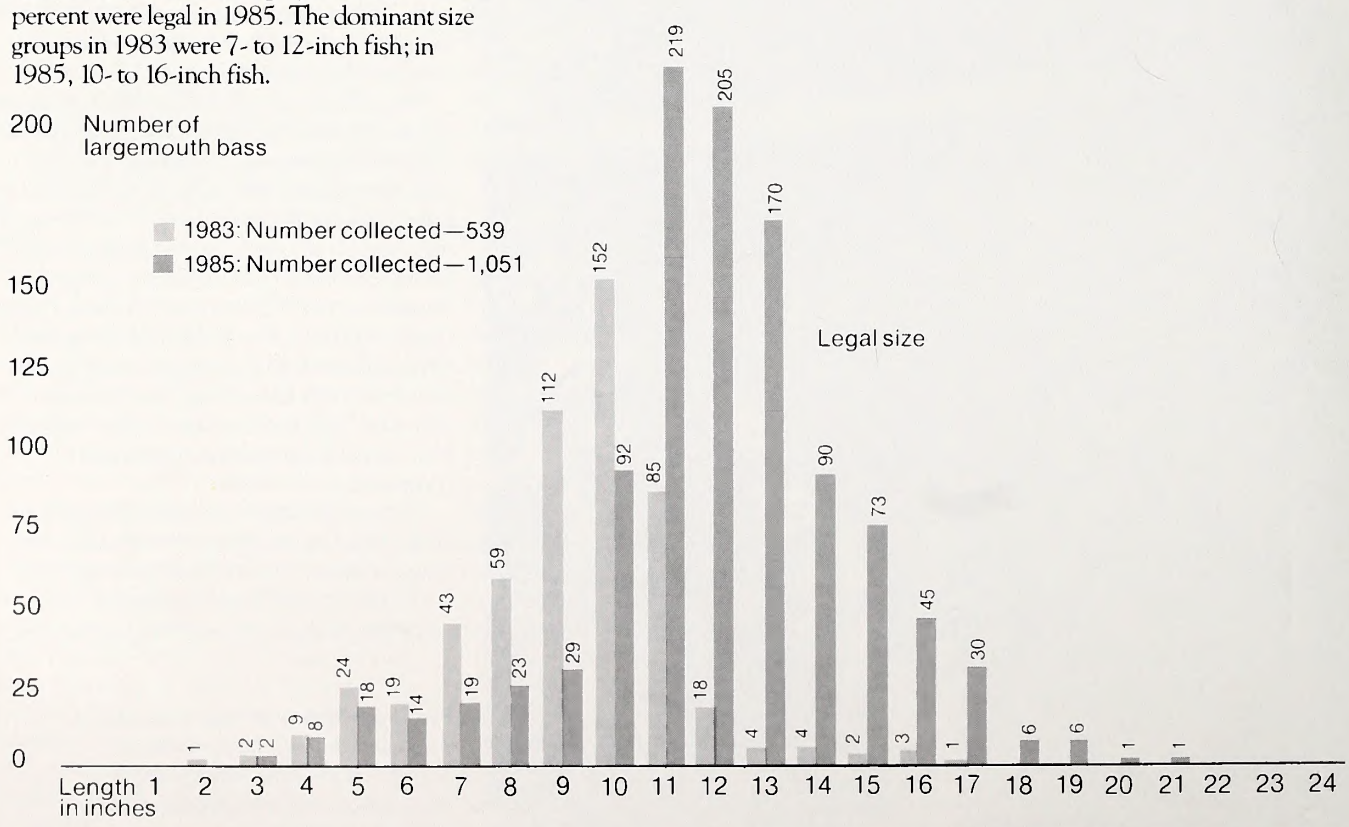
***Fisheries biologist*** *Roger Jones tussles with a Jordan Lake largemouth on a day off. On duty, he studies Jordan's fish populations with equipment that's a bit more scientific.*




***The days when anglers*** *could catch 100 small bass a day are past at Jordan Lake, and fishermen can expect to catch fewer, but larger bass.*

# Comparative sizes of largemouth bass captured by electrofishing in Jordan Lake in 1983 and 1985.

This graph, based on tests in 1983 and 1985, shows that 2 percent of the bass collected were legal size (14 inches or larger) in 1983, while 24 percent were legal in 1985. The dominant size groups in 1983 were 7- to 12-inch fish; in 1985, 10- to 16-inch fish.



said others. "Something in the water is killing these bass, and to be honest I'm just a little afraid to eat Jordan Lake fish," was another feeling expressed to me. How true were these statements?

During 1983 and 1985, the Division of Boating and Inland Fisheries initiated an investigation of Jordan Lake's developing fish community, particularly the largemouth bass population. Biologists planned to use this and future information to set bass management goals for Jordan Lake. In addition, North Carolina's Division of Environmental Management (DEM) and the University of North Carolina at Chapel Hill have been monitoring Jordan Lake's water quality and heavy metal concentrations in fish since 1982. The purpose of this monitoring is to establish use limits for water supply and recreation. The findings from these investigations should shed some light on the variety of concerns expressed by anglers.

Let's review water quality findings that have been reported by DEM and University officials. Since the reservoir was filled, Jordan Lake's water quality has been good—acceptable in all areas for both water supply and recreation. Analysis of fish tissue from 1982 and 1983 studies show the levels of mercury and other heavy metals to be below the average background levels found in other reservoirs throughout the state. The DEM report concluded by reporting, "The concentrations of mercury and the other heavy metals found in fish of B. Everett Jordan Lake are of little concern environmentally or for human health." It would therefore appear that anglers need not be concerned about eating bass and other game fish species from Jordan Lake.

DEM does, however, warn that the potential exists for development of undesirable blue-green algae blooms in the future because of the heavy nutrient loads entering the reservoir. Nutrient concentrations and phytoplankton abundance have varied in the reservoir's early life. A lack of rainfall can trigger algal growth, particularly during the summer months, but adequate rainfall has helped flush the lake system and prevented blue-green algae blooms which can cause fish kills.

To evaluate the largemouth bass population in Jordan Lake, fisheries biologists have been capturing bass with an electro-fishing boat. The electro-fishing rig stuns fish as it moves parallel to the shallow shoreline and biologists scoop the bass up with dip nets and place the fish in holding tanks. Fish lengths are recorded for all bass captured while weights and scale samples are collected from a percentage of the bass. Biologists can determine the age and growth patterns of bass by studying the scale samples. Bass collected in 1985 were also observed for overall health and condition (hook wounds, diseases, etc.). All bass are released unharmed.

For sampling purposes, Jordan Lake was divided into lower, middle and upper sections. In all, 16 permanent sample sites were selected on the reservoir and the shoreline distance at each site was measured. A total of 20.7 miles or approximately 14 percent of the lake's shoreline was sampled. By shocking a premeasured section of the shoreline, biologists can evaluate the abundance of fish by the number of fish caught within a given distance.

In 1983, 539 bass were collected from 12 sample sites, and 1,051 bass were collected from 16 sample sites in 1985. In 1983, 2 percent of the bass collected were legal size (14 inches or larger), while 24 percent were legal in 1985. The dominant size groups in 1983 (one year after stocking) were 7- to 12-inch fish. However, in 1985, three years after stocking, the dominant size groups were 10- to 16-inch fish. Of course, the shift in size distribution is predictable, and the increase in numbers of harvestable bass will continue for a few more years before it stabilizes. Anglers should realize that the changing size distribution means the days of catching 100 or more 8- to 12-inch bass in a single fishing trip are over. Yet, although anglers will catch fewer bass, those they catch should be larger, and this is pretty much what you should expect for the rest of the 1980s.

The relative abundance or total numbers of bass is determined from what biologists call the catch per unit effort (CPUE) based on the shoreline distance shocked. For example, catch rates for bass between 12 and 18 inches increased from .0004 fish per foot (1 bass per 2,548 feet shocked) in 1983 to .004 fish per foot (1 bass per 251 feet shocked) in 1985. This suggests that there are adequate numbers of harvestable bass in Jordan Lake. However, the numbers of small bass (8 inches or less) in the sample was extremely low. Biologists suspect this may be because electro-fishing equipment is most effective on larger fish, but it may also indicate the result of a poor bass spawn in 1984. The relative abundance of two-year-old bass present in the 1986 sample will help answer this question because the bass will then be large enough for electro-fishing equipment to give a more accurate sample.

Bass growth in Jordan Lake has been spectacular with some fish reaching 10 to 12 inches in their first growing season. Of the 104 bass whose ages were checked from the 1983 sample, 85 fish were one year old, and the remainder were preimpoundment fish ranging from two to four years old. The average size of a one-year-old bass from the 1983 sample was 8.7 inches. In 1985, ages were checked on 119 bass, and three age groups were represented. The average sizes of one-, two-, and three-year-old fish were 8.3 inches, 12.6 inches and 16.2 inches, respectively. These growth rates are much higher than the state average of 3 to 4 inches of growth per year. Fish from nearby Piedmont reservoirs typically do not reach 16 inches until their fourth or fifth growing season.

For the most part, Jordan bass were extremely fat and healthy and in good condition. Numerous fish in the 12- to 14-inch category weighed between 1½ to 2 pounds which is robust. However, some diseases and parasites were noted on approximately 5 percent of the fish collected in 1985. The most common disease observed was a bacterial infection which appears as bloody wounds or blood under the scales of fish. This bacteria is prevalent in North Carolina waters and normally does not infect fish unless fish are experiencing stressful conditions. Biologists feel the dead bass observed in Jordan Lake in early 1985 probably succumbed to a combination of stressful factors. Such stress can result from being hooked by fishermen (10 percent of the fish collected in the 1985 sample had evidence of hook wounds), spawning activities and/or certain environmental factors such as the unseasonably warm weather experienced in March 1985.

The decline in bass catches—particularly intermediate size bass (12-16 inches)—from Jordan Lake in 1985 is difficult to explain in light of these findings, but there are several possible explanations. As bass grow older and reach maturity, their habitat preferences change and anglers must adjust accordingly. Also, bass that are caught and released repeatedly become wary and are not as likely to strike the angler's favorite lure. Finally, the unusual weather conditions prevalent last spring may have been a contributing factor. Perhaps that's what makes fishing such an intriguing sport—just when you've got all the angles figured out, the fish change the rules.

If we get good weather conditions, those bass fishermen who adapt their techniques for older, smarter bass should have good success this year for 16- to 20-inch bass. As for me, I plan to keep on sampling the population, and when I get some spare time, I'll also be doing some "sampling" with a rod and reel. ⊠

# A HATCH OF

*A backyard naturalist photographs the fascinating birth of some of his favorite creatures, the gentle and handsome green snakes.*

*written and photographed by Kerry Givens*

Like many naturalists, I am guilty of associating certain wild animals with particular seasons of the year. Autumn conjures up images of gray squirrels frantically collecting acorns. Mention evening grosbeaks, and I think only of winter (and my birdseed bill). I equate spring with gray treefrogs calling from their breeding pond, and sometimes from our neighbors' pool. And if I had to select one animal that I associate with summer in North Carolina, I would pick the rough green snake. Not because its scientific name, *Opheodrys aestivus*, means "tree snake of summer," but because every time I have encountered one of these snakes, it has been on a dreadfully hot, humid, dead-of-summer day.

I recall one such day in the Green Swamp south of Wilmington. It was August. I had entered the swamp at dawn, hoping to photograph wild orchids resplendent in the morning dew. By the time the sun appeared, the temperature was already on its way into the 80s and my clothes were soaked with sweat. After spending 20 minutes on my knees trying to get some close-ups of a Venus flytrap, I rose to loosen my leg cramps and smash a few mosquitoes. As I was wiping the perspiration out of my eyes, I spied the snake. It had been only 3 feet from me throughout my photo session, draped motionless in a maple sapling. Apparently it had spent the night there, for the animal was covered with dewdrops. Our staring contest only lasted a few seconds. Before I could reach for my camera, the snake zipped down the spindly tree and disappeared into the thick grass. Although the whole scene lasted only a moment, the image of that dewy, brilliant green reptile is still a vivid memory. I look back on it as a reward for tolerating the sullen August heat and the four hundred chigger bites which appeared later that week.

Rough green snakes are still fairly common in North Carolina, particularly in the Piedmont and Coastal Plain. There is plenty of ideal green snake habitat near my home in Durham County — brushy fields with fencerows and abundant saplings. In July, walk along a mile or two of hardtop road in such habitat and you're bound to find a rough green snake — roadkilled. My field guides confirm that these snakes have a remarkable propensity for getting run over. Over several weeks of last summer, I noted a three mile stretch of asphalt in my area that claimed at least 10 of the snakes. This casualty rate reflects, in an unfortunate way, just how common rough green snakes are. Nonetheless I do not enjoy seeing one dead on the road, because the rough green is a harmless, nonpoisonous, and very beautiful animal.

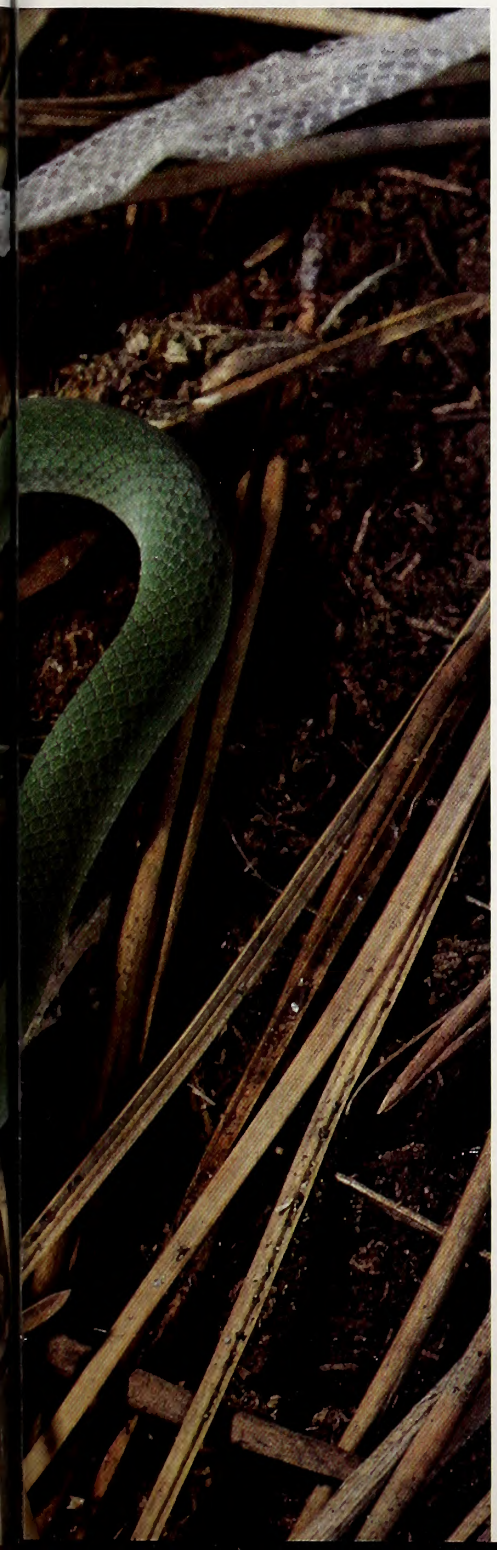
As common as roadkilled green snakes may be, my encounters with the living snakes are all too infrequent. So when a considerate neighbor called me about a green snake he had captured in his yard, I was ecstatic for the opportunity to see it. He "loaned" me the rather feisty critter on the terms that I return it to its habitat after I finished photographing it.

***Rough green snake*** *guards her hours-old eggs. The slender rough greens are harmless, feeding on a variety of insects.*

# GREEN

***The infant snakes*** *make their appearance six weeks after eggs are laid. The egg yolk supports them until hatching.*

*"After almost six weeks of high suspense, the infants finally made their debut. I lifted the lid on the hatching chamber that morning and marveled at the sight of a tiny green head peeking out of a slit in one of the eggs."*



The snake had been in my possession for only a few days when the blessed event occurred. My jaw almost detached when I peered in the terrarium one morning and found the snake coiled around three wrinkled, white eggs. They were roughly the size and shape of cough drops, and seemed impossibly large to have emerged from her pencil-thin body. Certainly there was no telltale bulge in her figure when she was first captured.

I left the female undisturbed because she seemed intent on guarding her clutch. However, within a day she showed little apparent interest in the eggs. Rather than haphazardly placing the eggs back in the wild, I elected to complete their incubation indoors and then release the youngsters. I contacted some of my snake-rearing associates in the North Carolina Herpetological Society and asked about the care of snake eggs. At their advice, I kept the eggs on a bed of moist vermiculite in a warm room. And waited.

Over the ensuing weeks, the eggs gradually swelled and lost their wrinkles, taking on the appearance of large, white jelly beans. One egg, presumably infertile, abruptly collapsed and became moldy. I began to doubt whether any of the things would ever hatch.

After almost six weeks of high suspense, the infants finally made their debut. I lifted the lid on the hatching chamber that morning and marveled at the sight of a tiny green head peeking out of a slit in one of the eggs. (I have read that many baby snakes use an "egg tooth" on the tip of their nose to penetrate the eggshell, but I could see no such structure. It had probably fallen off already.) The snake remained motionless until I gently touched its nose; then it abruptly snapped back inside the egg. Several minutes passed before it hesitantly stuck its nose out again.

***Tiny rough green snakes** shed their skins within a week of hatching. When hatched, they are three inches long, but will grow from 22 to 36 inches long.*

As if uncertain that it wanted to enter this strange, new world, the tiny snake remained in its egg the rest of that day. By the next morning, it had slithered out entirely, and the second egg was just beginning to hatch. The tiny snakes, only about 3 inches long, showed little concern for the camera equipment and electronic flashes that I jockeyed within inches of them — a far cry from the adult green snakes I have met, which have all fled for cover when I approached with my camera.

Baby snakes grow rapidly in the first few days after hatching, fueled mostly by the energy rich yolk that supported them throughout incubation. These baby green snakes were no exception. Within a week of hatching, the two had undergone their first shed. Somewhere in my dresser drawers, I still keep those tiny skins in a little jewelry box, much as a proud parent would save baby's first shoes. I have resisted the temptation to have them bronzed, however. It would just be gilding the lizard, or something like that.

At this writing, those babies have long since been set loose. Looking back, photographing their birth was certainly a high point in my "career" as a backyard naturalist. And yet, my understanding of green snakes is still far from complete. Occasionally, I drive past the field where I released the snakes, wondering whether the babies eat prey that is different from the adults. How do the snakes remain so active in the intense summer heat? Where do they spend the winter? These questions haunt me as I drive along at five miles an hour, my face close to the windshield, ready to slam on the brakes should someting green dart in front of the tires. I glance out over the field, realizing that it probably is home to 20 or more green snakes, all doing what they do best — hiding from nature photographers. ⊠

# The Great Smokies Nears 50

GEORGE HUMPHRIES

## The Great Smoky Mountains National Park will be half a century old in a few years. How's the nation's most popular park doing, and what looms in its future?

by Marjorie Corbett

September sun splashes like a tumbling stream into the bed of the pickup truck, dappling its load — three backpacks, a cooler, and me — with dancing light as if we were rocks under water. The truck sways as we descend and descend and descend down the mountain road.

Treetops and lush green undergrowth lean close over my head, then spring back into shapes that frame the scenery. I am entering Great Smoky Mountains National Park backwards, in a kind of visual retrospect that reveals new views at every turn. I have visited these hills many times, but never in the back of a pickup truck. It's a whole different perspective.

We swoop around the side of a mountain on the narrow blacktop road, and the sky breaks open between the trees. High above, a redtailed hawk follows our descent until the trees begin again to close in. This tangled greenery, whizzing by too fast now for identification, suggests wilderness, and signals the end of that portion of North Carolina soil dominated by man.

It is, in a sense, an illusion. People have always held sway, in one way or another, here in the Smokies, despite its untameable tangle. During certain parts of the year, the park ranks in population with any small city. Millions of people come here each year and stay — for a weekend, for several weeks — right inside the park at trailer camps, backcountry camps and horsepacking camps. More people come to Great Smoky Mountains National Park each year than to any other national park in the country — even Yellowstone.

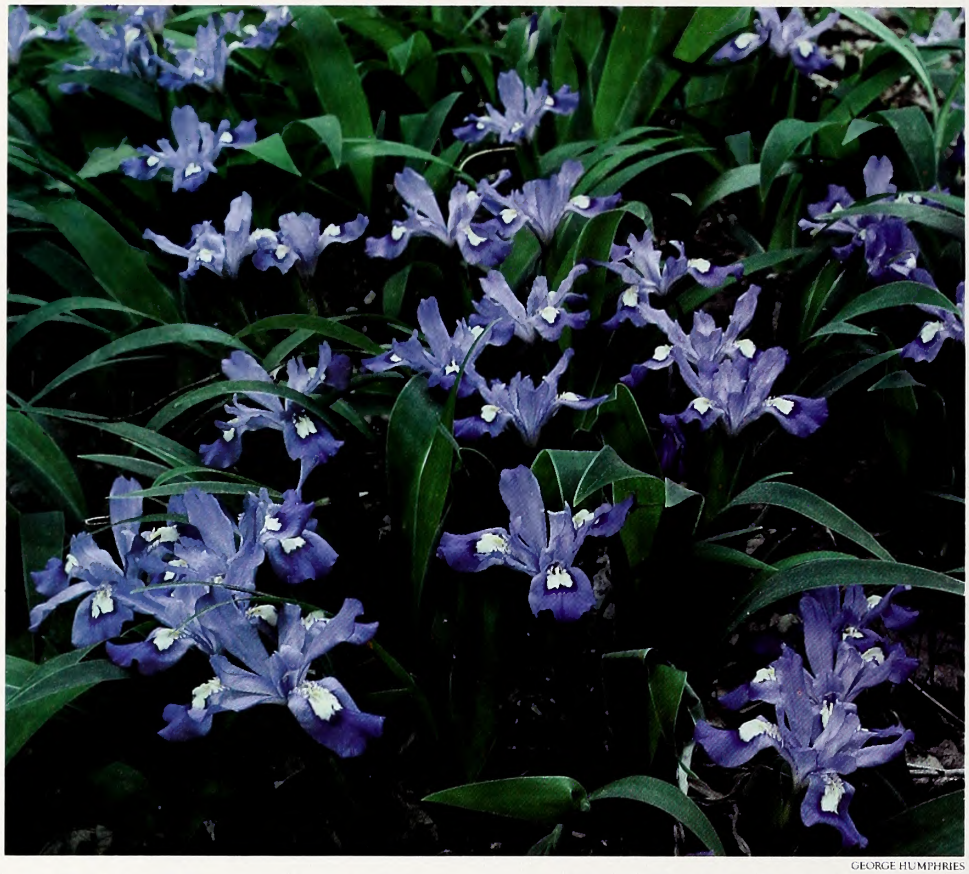
Sam, Steve, and I had come to the Smokies on a Labor Day weekend, like thousands of others, to enjoy time with friends and find that elusive, powerful sensation of being surrounded by a world made up of wild things, high mountain peaks, and unfamiliar terrain. On this visit, I wanted to test a theory of mine — that it is still somehow possible to get off the beaten track in America's most popular park during the height of the season.

When planning our trip, I had carefully picked a backcountry campsite that was away from the Appalachian Trail and other popular trails, accessible only by a one-way dirt road most trailers and cars would avoid. The trail to the campsite led up a steep ridge in switchbacks. From high above the road, we could just glimpse the contour of the slope across from us through the trees. In the feathering layers of foliage a lone woodpecker tapped. We stepped over a trickling stream whose origins were high above and whose destiny lay, in an almost vertical path, far below in Raven Fork, a tributary of the Oconaluftee River.

Near the end of a sneaker-stumping rocky path, the unmistakable sense of topping a ridge made us pause and look around. Although there was no clear view between the trunks of mature spruce, I felt a sense of openness, or perhaps it was a change in wind direction or light or the scent of the air. The path to the peak lay in one direction, the path to the campsite in another.

The passageway led in crooked loops to a sudden clearing. Walls of greenery, whitened spruce trunks, and an enormous fallen trunk enclosed the clearing on all sides, and in the center a giant specimen of an oak squatted proprietorially, reaching out long branches in a wide circle. Under the oak, a lush bed of grasses spread over knobby roots like a green velvet skirt. A wild, sweet smell hung in the air, reminding me of another mountaintop, years ago, where there had been bears and blackberry bushes. We set down our packs and rested. We were home.

***Daisies form*** *pretty launch pad for view into the Great Smoky Mountains. More people visit the Smokes each year than any other national park in the United States.*



GEORGE HUMPHRIES

***Crested iris*** *is only one of 1,500 flowering plants that grow in the Smokies. The park's diversity of plant and animal life have made it an international biosphere reserve.*

We had wanted a remote spot, and we had found one. Although there were signs of previous campers — fire rings, an old tarp stashed in the hollow of the fallen tree, a useable bear line — we had seen no one on the trail. In fact, we had seen no one on the road leading to the trail. From what I'd seen in other parts of the park, we were probably the only campers in the park that night who were actually isolated from civilization. Or so it seemed.

They say that when European settlers first arrived in North America, a squirrel could walk from the Atlantic to the Mississippi without ever touching the ground. In this eastern park where 40 percent of the land is virgin forest, you can see how that must have once been true. Horace Kephart, in his celebrated book, *Our Southern Highlanders*, describes the lives of mountain folk after the turn of the century until the 1920s before the park was established. The turn of the century brought loggers in droves, reaping the bounty of virgin timber in a boom era. Since the National Park Service took over, mountain settlements at Oconaluftee, Cades Cove, and Mingus Mill have been restored for visitors to see, and a remnant of an old logging town at Elkmont still holds a score of summer cottages inside the park.

The guidebooks say that within the park's half-a-million acres you can find 1,500 species of flowers, 200 kinds of birds, 50 kinds of mammals, 80 kinds of reptiles and amphibians, 70 species of fish, 2,000 kinds of mushrooms, even 22 kinds of salamanders, and more tree species than in all of northern Europe. These are pretty impressive figures, but they're as dry as the qualifications for becoming an International Biosphere Reserve, which the park is. What is truly impressive about these numbers is that they reflect an extraordinary lushness, a deep diversity that says "everything around you is alive, moving in secret, mysterious patterns that you can't see, you can only count."

That the ecosystem here is complex is an understatement. In a single stroll to the top of a peak, you can go through at least six ecosystem types, including Georgia mixed oak and pine, cove hardwoods, New England forests, and Canadian spruce forests. The park is the northernmost habitat for many southern United States species of plants, and the southernmost habitat for many northern species. Some of the plants and animals are rare in this part of their range, and some are found nowhere else in the world. Every living thing seems to thrive in the humid, warm, fecund places under the trees and in the shadows of the thickets.

And yet, the disturbing signs of man's meddlings have begun to concern the caretakers of this vast experimental greenhouse. Bear populations are down, wild hog populations are up, native brook trout are in trouble, and mountaintop spruce in the highest peaks are withering to white, bare stalks under the constant assault of acid rain. Where once a ton of bear could be brought down in a single day and a barrel of fish could be captured overnight, according to writer Roderick Peattie, there is trouble in paradise.

The National Park Service staff here have a list of management problems as long as your arm. Ambitious plans for studying these phenomena and dealing with them abound. On an earlier trip, I sat in on a staff meeting for park wildlife biologists as they reported on their various projects.

One told about his progress in monitoring deer populations using radio telemetry and dawn and dusk counts. According to his data, blue tongue disease is common among the white tails, but hemorrhagic disease was down in Cades Cove. Another told how the six peregrine chicks brought from Cornell University and reintroduced to Greenbriar Pinnacle were almost ready to fledge. The problem was how to keep them away from areas well populated by their primary enemy — the great horned owl.

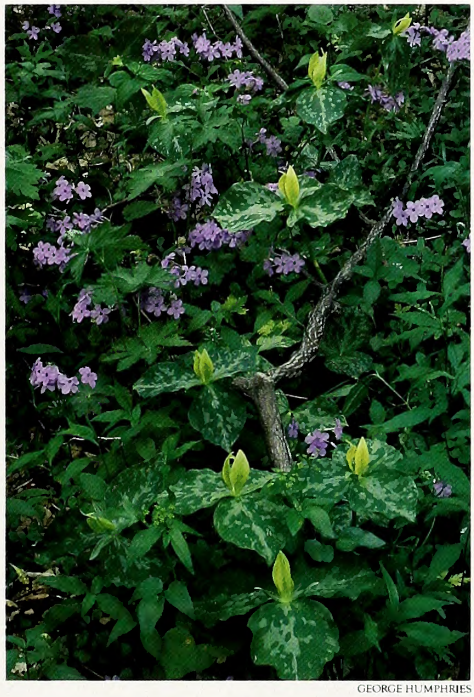
One biologist reported that his river otter reintroduction program was ready to go, except that the trapper contracted in Michigan to deliver pairs hadn't any to send. Another report gave the inside story on U.S. Forest Service plans to clear-cut large areas of surrounding forest, which may reduce the bear populations.

Probably the most well-known problem the park faces is the battle of bears versus boars. The bears have been here forever, but the wild hogs are mongrel remnants of an era when gentlemen hunted the European wild boar in mountain game preserves while hardscrabble mountain farmers let their farm pigs out into the woods to forage for food on their own. Both varieties have since gone wild and interbred, reproducing like mad every few months, and adding up to about 1,500 mean razorbacks in the back reaches of the park.

In this harsh but protected mountain environment, the hogs have cut a wide swath in the ecosystem, rooting up stands of delicate wildflowers and rare plants on the high balds, and "hogging" the limited mast supply on which bears and wild turkeys rely for fall forage. In years when mast production is low, the bears have a hard time competing, particularly since the demise of their most

MARJORIE CORBETT

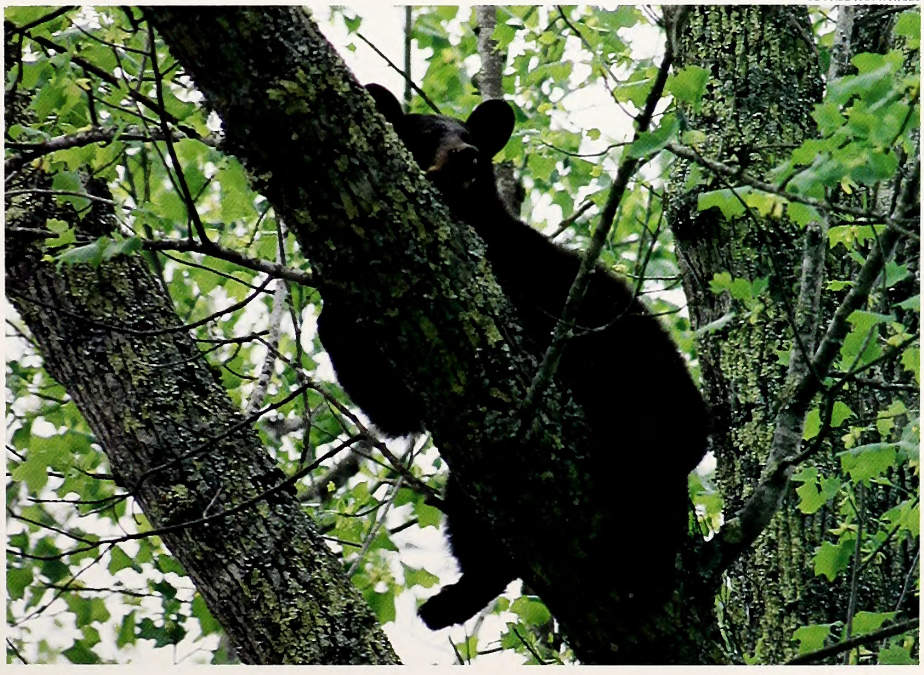
***The park was once home*** *for little settlements like this farm at Oconaluftee. The National Park Service has restored many of these old farms for the enjoyment of visitors.*



GEORGE HUMPHRIES

***Spring hikes through*** *the Great Smokies are even more enjoyable with the profusion of flowering plants to gaze at, including yellow trillium and purple phlox.*

GEORGE HUMPHRIES



***Black bears are*** *as likely to be sighted begging food from Smokies visitors as up a tree. Park managers are concerned that competition between bears and wild hogs is hurting the bear population. In 1985, a severe winter in the mountains hurt the mast crop, and there were fewer bear cubs as a result.*

GEORGE HUMPHRIES

***Clingman's Dome** is the Great Smokies' highest peak, followed by Mt. Guyot and Mt. LeConte.*

reliable food supply in the Smokies, the American chestnut. You get the idea that a strange race for survival is at work here, with man's introduction of both the chestnut blight and the hog tilting the balance away from the balanced ecosystem that prevailed for centuries before Columbus discovered America.

Reports on the bear population for 1985 were not good. A cold winter caused a total mast failure. No cubs were sighted all spring. Severe winter storms knocked out scores of denning trees. The high estimate of bear numbers in the park is 500, and tagging has shown that many bears range outside the park, where they can be legally hunted in season. Poaching in the western part of the park is common, and ranger patrols tell harrowing tales of night patrols and shootouts.

So far, the boars are winning the battle with the bears. The park has an ambitious study going on to find ways to lure wild hogs away from this protected habitat. Park biologists showed me the holding pens where the hog study is currently underway. They hope to uncover a scent strong enough to lure hogs to traps like lemmings to the sea. After the staff meeting, one biologist showed me the test scents being used in the study: a mast scent, a honey scent, the scent of a female in heat in great concentration, and various commercial products used to attract deer. Of all of these, one may provide a solution, but more likely the study will stack up in the files, like those before it, awaiting administrative directives and funding to act on the problem directly.

While I visited with the rangers, I heard a lot of hopeful talk about the new National Park Service director in Washington—William Penn Mott. During the tenure of Interior Secretary James Watt, all the national parks suffered from budget cuts, staff cuts, and a general lack of support for protecting natural resources. During 1985, a clean sweep in the Interior Department brought new blood into park management, including the new director. Mott, a former state manager for parks in California, had some proven conservation credentials and seemed to have the leeway to try some new things.

The rangers said that Mott had just issued what is called "the twelve point program," offering more administrative support to parks dealing with management problems like those in the Smokies. In one of his statements, Mott said he would close any park to the public rather than see its wildlife overstressed. This statement has caused a lot of excitement among both park rangers dealing with crowds and park visitors clamoring to get in. New park managers see

this as a vote of support for long-neglected natural-resource protection programs. But many taxpayers insist on their right to use the parks, even though they sometimes complain about overcrowding.

Balancing the needs of people and the needs of wildlife can be tough. In the past year, rangers closed the Yosemite Valley to cars one weekend when the parking lots filled to bursting. But closing Great Smoky Mountains National Park to visitors is an unlikely solution to overcrowding.

"Because it's the most visited park in the country, the Smokies is in many ways a microcosm of the problems in all the national parks," says Destry Jarvis, vice-president of the National Parks and Conservation Association, a citizen watchdog group in Washington. "The boundaries of the Smokies are not drawn broadly enough to include the natural range of wildlife the park must protect, and visitor crowds compete for space with wildlife, resulting in a tremendous management headache for rangers. Even with a philosophically attuned leader like Bill Mott, under the current system the park has little power to enforce policy." The federal bureaucracy in these hills limits staff to a minimum level and makes it difficult to carry out policies suggested by wildlife studies.

Jarvis sees some solutions in the offing, however. A new study of the human carrying capacity of the park will be released this year, and the Smokies may be able to use this data to better manage overcrowding. Major routes and popular trail heads could become more accessible and less overcrowded simply by providing bus service that would keep car traffic from jamming the roads. Also, the park's new status as a biosphere reserve means more interest among both national and international leaders in keeping the park's wildlife protected. One way to do that would be to create a buffer zone around the park, within which wildlife and development could be studied.

"Extending the biosphere reserve area beyond park boundaries is a good idea," says Jarvis. "It wouldn't limit development on private land, but could help encourage cooperative monitoring of wildlife in surrounding areas, including U.S. Forest Service lands. But the biggest problems of the park are external threats, like acid rain, that the staff can't possibly have any control over."

In many ways, the park is lucky. It already has myriad cooperative programs and support staff provided by universities in both Tennessee and North Carolina. Its staff is handpicked from among the best park managers in the country. And because it is so large, and so popular with tourists,

GEORGE HUMPHRIES

Gramm-Rudman budget cuts will have a limited effect on its staffing levels. In addition, there are hopeful signs this year that acid rain legislation may pass Congress, a first step toward saving the remaining spruce on Spruce Mountain and other high peaks.

Such bureaucratic headaches seem far away to boneweary backpackers. As we sat down to dinner, back on Spruce Mountain, a full moon rose over our campsite, its golden light shining like a benediction on our full plates. We talked and played cards into the night, while outside our circle of lantern light, the dark forest whispered its night secrets.

The day ahead would hold a thousand small discoveries — a bear-pawed yellow-jacket hive, a new mountain stream to cool our heels, a yellow flicker tapping spruce, a single red leaf turning the season on its axis, bristly sarsparilla, Indian pipes, and purple gentian along our path, Cherokee children with wide faces and dark eyes swimming and fishing in Raven Fork, and a view of the mountains receding, framed by more mountains, from the back of a pickup truck.

This is what we came for, and this is what we can still find, in the Smokies, if we look for it. ⊠

MARJORIE CORBETT

***Crystal-clear high altitude*** *streams contrast with evidence of man's intrusion (above). Red spruce tree shows signs of damage, possibly from acid-rain pollution in the atmosphere. Acid rain is suspected in the deaths of spruces and firs in many high-altitude forests in the southern Appalachians.*

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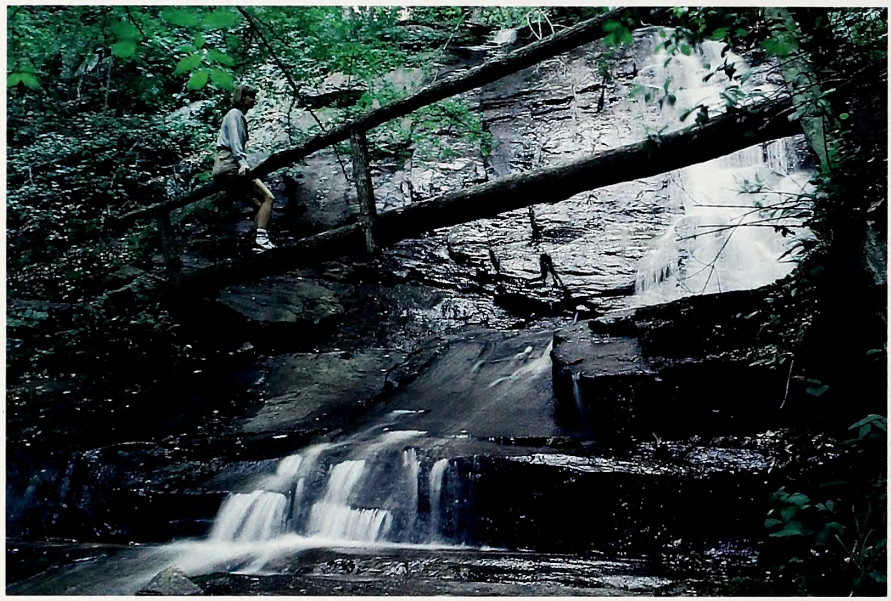
*Marjorie Corbett is former senior editor of* National Parks *magazine, now a freelance writer in Chatham County, North Carolina, focusing on conservation and nature.*

# GUIDE TO THE SMOKIES



***Scenic waterfalls** and bridges delight the eye throughout the Smokies.*

Hiking and photographing The Great Smoky Mountains National Park can be a treat, especially if you get off the beaten path.

written and photographed by Joel Arrington

It's hard to imagine how long it takes for a mountain range as high as the Rockies to be worn down by freezing cold and rain to the relatively rounded forms of the Smokies. A long time. Experts say these hills in the Great Smoky Mountains National Park are old, but on a bright spring morning, with flowers blooming in every glen and roadside ditch, they seem fresh and young. It is easy to believe that they have been this way forever. In fact, it has been only about 50 years since local initiative and federal action saved this natural area from commercial exploitation and created what has become the most visited park in the country.

Despite nine million visitors a year and damage from acid rain, much of the park's unspoiled beauty is still intact. Nature buffs, natural history students and photographers can spend their time very productively here. Tourists tend to start their days late, leave early and remain in their cars on the main roads. The naturalist/photographer who arises early, proceeds mainly by foot and gets off the main roads will encounter fewer crowds, except on the overused Appalachian Trail. An 800-mile trail system, which hikers are encouraged to use rather than the AT, gives access to the most remote corners of the park.

As old as they may be, many peaks in the park ascend to more than 5,000 feet. Along their running ridges are spruce/fir forests characteristic of more northerly climates, and in some of the secluded coves are world-record trees and virgin stands of magnificent hardwood forest. We can only hope they will survive the hard rain of modern America until industrial and auto pollution can be reduced.

Straddling the border between North Carolina and Tennessee, the Smokies Park is one of the most diverse natural areas on the continent. To the amateur naturalist and photographer, the Smokies Park is a fertile field for study and exploration. Throughout the 800 square miles are rushing brooks, cascades and waterfalls that beg to be photographed. Nearly 200,000 acres have never been commercially logged. In certain locations there are unmolested animals that are relatively easy to photograph. In season, wildflowers bloom in sufficient profusion to satiate the most ambitious hobbyist.

Expect rain. Annual rainfall averages 90 inches at higher elevation on the western slopes. It rains more on the Tennessee side. Cloudy days produce good light for close-ups, with a wrap-around quality, reduced shadows and greater color intensity. Carry light rain gear and take steps to protect your equipment.

Wildflowers abound in spring and summer. Your best shots will be with natural light and long exposures. You need windless days or a windbreak. Carry a folded 4 foot by 6 foot sheet of clear or frosted heavy-duty plastic to surround plants and support it with sticks or your tripod. A camera whose mirror can be locked up or one with a self timer will be essential for exposures which may exceed one second at the high f-stops you need for adequate depth of focus, even in good light. Under heavy foliage, your exposures may run too long and you will be forced to use flash. Even multiple light setups tend to produce unwanted shadows, so most flower photographers wait for better conditions. You will want a tripod which will position a camera close to the ground. Experts carry cheesecloth and a frame to stretch it to shade a flower in direct sunlight. Crumpled foil may be used as a reflector.

Black bears are commonplace around heavily used campgrounds and may show up anywhere. They are harmless unless fed or molested, but take seriously the Park Service's warnings to leave them alone. White-tailed deer run in herds at Cades Cove and are frequently seen at Clingman's Dome and elsewhere. Early morning and late evening are best for sighting deer, but low light limits photography. You may also encounter Russian boar, and care should be taken since they are potentially dangerous, and should not be cornered. Many smaller mammals such as opossums, groundhogs, raccoons and skunks may be seen around campgrounds, and weasels, mink and beaver are present in the Park, but seldom seen.

Few, if any, places in the world rival the Smokies for abundance and variety of salamanders. At least 22 species occur here and new ones are occasionally described. One, the red-cheeked salamander, occurs nowhere but in the park. The best time to

***The 517,000 acres** of the Great Smoky Mountains National Park include the East's largest virgin forest.*

***Visitors wishing a window*** *into the pioneer past can travel an 11-mile road through Cades Cove, unusual in the Smokies because of its open farmland scenery. Over 600 people lived in Cades Cove in 1850. Today, houses, churches, restored cabins and the water-powered Cable Mill show what life was like for the early settlers.*

***Wildflower photographers*** *crowd the roads in spring and fall for the incredible floral display in the Great Smokies. Bluets are but one of hundreds of species that provide a pretty subject for the camera.*

find amphibians is at night and during rains when they exit their cover. Specialists tape flashlights to their flash units and may shoot with telephoto lenses (often zoom teles) on bellows, permitting focusing over a wide range without moving the camera. You may find enough salamanders for your purposes by turning over rocks in small streams.

Ferns are everywhere. From the profusion and variety, you might think there are too many to ever learn, but this is one field where a dedicated naturalist can become familiar with all the species. My wife, Lundie, and I photographed a half dozen in two days recently, including Christmas, maiden's hair, rattlesnake, resurrection, cinnamon and the light yellow-green New York fern.

You may never get around to all the waterfalls. If you follow any stream away from the crowds, you are likely to find falls and stones that have not been denuded of moss by rockhoppers. Tourist literature describes many falls in the area. Three miles north of Bryson City, trails lead to three falls from Deep Creek Campground. Along the way there last May we saw fire pink, Solomon's seal, alum root, jack-in-the-pulpit, maiden hair fern, and resurrection fern.

If you arrive early and stay late, you may avoid crowds on the log footbridge at Junewanka Falls.

One way to avoid cliched scenic shots from overlooks is to be set up early. Because of the remoteness of some of the overlooks, that may take some doing. Often you have to plan your shot in advance, arise two hours before dawn and drive without breakfast to the location. It's a good idea to carry a cache of food and drink and try not to be too structured about meals. Fog and clouds at high elevation often obscure your view, but they can break suddenly, then close in again, offering a window of opportunity for an interesting shot.

There are public and private campgrounds, motels and inns within and surrounding the park. Concentrations are at Cherokee and at Gatlinburg, Tennessee. Townsend provides more convenient access to Cades Cove. Write Cherokee Visitors Bureau, Box 465, Cherokee, NC 28719 and Gatlinburg Chamber of Commerce, Gatlinburg, TN 37738 for accommodations lists. Call 800-VISIT NC for directories of campgrounds and accommodations on the North Carolina side. For a list of park campgrounds, write Superintendent, Great Smoky Mountains National Park, Gatlinburg, TN 37738. Reservations for them must be made through Ticketron, Box 2715, San Francisco, CA 94126, not more than eight weeks in advance. During the fall color season, reservations everywhere are mandatory. During the rest of the year, if you arrive at a motel before 10 a.m., you are likely to secure a room without a reservation.

Back country camping within the park requires a special permit. You may apply for it in advance at the park address above or by calling 615-436-9564 from 8 a.m. to 4:30 p.m. Monday through Friday, but it has to be picked up in person no more than 24 hours before the beginning of the trip at one of three locations within the park.

No one should lack for publications and guides to the Smokies. The Park Service has some of the most useful and least expensive, including, for 15 cents each, "Auto Touring," "Forests and Wildflowers," "Streams & Waterfalls," "Wildlife," "Mountain People," and "Walks & Hikes." The Great Smoky Mountains Trail Map and Great Smoky Mountains National Park brochure are free.

An excellent guide to streams and trout fishing is Don Kirk's *Smoky Mountains Trout Fishing Guide*. It is available for $8.95 plus $1.50 shipping and handling from Menasha Ridge Press, Rt. 3, Box 450, Hillsborough, NC 27278.

The Great Smoky Mountains Natural History Association, Gatlinburg, TN 37738 lists several titles of interest. Include $2 for postage and handling:

- *Great Smoky Mountains Wildflowers*, Campbell, Hutson and Sharp. ($4.75)
- *Amphibians and Reptiles of the Great Smoky Mountains Park*, Huheey and Stupka. ($4.95)
- *Notes on the Birds of Great Smoky Mountains National Park*, Stupka. ($4.95)
- *Hikers Guide to the Smokies*, Murless and Stallings. ($8.95)

Among my favorite spots in the Smokies area, though not within the park, are Lewellen Cove Walk near Fontana Village Resort and Joyce Kilmer Memorial Forest. Both feature labeled trees and signs that describe plants and their uses. Kilmer Forest is unforgettable for its cathedral-like virgin forest conjuring primeval North America before it was inhabited even by Indians.

Cades Cove is so beautiful it makes you cry for what we have done to the rest of the country. The pioneer homestead there recalls a time when man lived in better harmony with the land, but the idyllic appearance obscures the almost certain hard times that prevailed. An hour away is Clingman's Dome. You drive through a boreal forest that is dying inch by inch. Along the way we photographed trayway and Clinton's lilies and roadside bluets, which went all the way to the top—6,642 feet.

Most of all, I love Cataloochee Cove at the far eastern end. It is more difficult to reach and much less visited than other parts of the park. Last spring, we photographed cinnamon fern in a large field of ragwort and ox-eye daisy. An old mossy chestnut footbridge crossed the creek there where we ate our lunch. ⊠

***Natural history buffs** will have to keep their eyes peeled to see the spotted salamander. There are 22 salamander species in the Smokies, a high number for an equivalent space anywhere in the world. Deer, black bear, boar and many other mammal species proliferate in the Park's confines.*

*Forty-Nine Schools Participate*

# West Davidson High School Wins Hunter-Safety Tournament

*Written and Edited by Mark Taylor*

West Davidson High School in Lexington defeated 49 other schools to emerge as the overall champion in the eighth annual North Carolina Hunter Safety Shooting Tournament held Saturday, April 26 in Kinston. In the junior high division, West Bertie Elementary School in Roxobel finished first.

The tournament is sponsored by the N.C. Wildlife Resources Commission, and competition is held in three events — archery, rifle and trapshooting. Only school teams may compete, and all team members must have completed a Commission-sponsored hunter safety course. The winning West Davidson High School team set new state records in all three events. The team is coached by Kevin Long, and members are Allen Lamb, Chad Hartley, Greg McElrath, Ramie Spainhour and Bodie Owens. West Davidson was followed by Pamlico High School of Bayboro in second place, Ledford Senior High School of Thomasville in third, and Rocky Mount Academy of Rocky Mount in fourth.

The winning team from West Bertie Elementary School was coached by Bobby Occena, and team members are Brandon Craft, Shay Watts, Garrett Johnson, Clint Townsend and Lee Bunch. West Rowan Junior High School in Cleveland finished second.

Top schools were also recognized in the three events. In trapshooting Pamlico High School of Bayboro finished first, Rocky Mount Academy was second, and Southern Alamance High School of Graham was third. In the rifle competition West Davidson High School was first, Ledford Senior High School was second, and Pamlico High School was third. In the archery competition Ledford Senior High School was first, Pamlico High School was second, and West Davidson High School was third.

TERRY SHANKLE

***New Champs:*** *West Davidson High School in Lexington recently won the 1986 North Carolina Hunter Safety Shooting Tournament. Here, Steve Cline, coach of last year's winning team at Ledford Senior High School in Thomasville, presents the traveling trophy to West Davidson Coach Kevin Long. From left to right, team members are Allen Lamb (behind trophy), Chad Hartley, Ramie Spainhour, Bodie Owens, and Greg McElrath.*

Individual winners were also honored. The top competitors overall were Randy Daniels of Pamlico High School in first, Greg McElrath of West Davidson High School in second, and Barry Gregory of Forbush High School of East Bend in third. In the junior division, Brandon Craft of West Bertie Elementary School was first. The top score in trapshooting was shot by Rod Payne of Southern Alamance High School in Graham, and top honors in rifle and archery competition went to Greg McElrath of West Davidson High Scoool.

Several optional events were added to this year's tournament. A muzzle-loader shoot was won by Page High School of Greensboro. The outdoor skills competition, which tests wildlife knowledge and associated skills such as orienteering, was won by the South Johnston High School FFA of Four Oaks. Juniors and seniors competed together in this event, however, and Brandon Craft of the West Bertie Elementary School was the only competitor to turn in a perfect score.

The overall winning teams and individuals in the junior and senior divisions will have the opportunity to represent North Carolina in the North American Hunter Education Grand Championship at the Camp Lejeune Marine Base from July 23-27. This event is sponsored jointly by the National Rifle Association and the North American Association of Hunter Education Coordinators, and will draw school teams from throughout the United States and Canada.

"We're very pleased with the results of this year's tournament," said Captain Wilton Pate of the Wildlife Commission's Division of Enforcement, who also served as tournament director. "We had 50 schools with 394 students participate. The top four schools exceeded last year's winning score, and numerous records were set in each category. It's obvious that the kids and coaches worked very hard, and their dedication showed. We'd also like to thank all of the volunteers who helped us conduct the tournament, and the individuals and businesses that donated prizes."

*Try This Tip, Anglers*

# Toothpaste Kills Odor Of Fish

Fish have a way of staying with you long after they've been caught, and getting the odor off your hands is a problem that has plagued anglers since the stone age.

Here is a solution that works, however. Simply take a tube of toothpaste and put a small amount on your hands. Dampen your hands and rub them together. Work the toothpaste into a lather, and then wash your hands off. The odor of fish will be gone.

*— Lawrence Musselwhite*

*'86-'87 Hunting, Fishing Regs Approved*

## Wildlife Research Area Established On Sandhills

An 8,000-acre portion of the Sandhills Game Land will be devoted to wildlife research in the future. This was one of the changes in hunting, fishing and trapping regulations adopted by the Wildlife Commission at a meeting in Raleigh in April.

The wildlife research and habitat demonstration area is located near Hoffman and encompasses the Sandhills field trial area and adjacent lands north to Naked Creek. Research projects involving big and small game are currently being developed for the area. Field trials will be allowed on the area, and dove and deer hunting will continue as in the past during the 1986-87 seasons. The remaining 54,000 acres of the Sandhills Game Land will remain open to all forms of hunting and trapping.

A check-station system of hunting was also established for the Sandhills and Bladen Lakes State Forest game lands. On the Sandhills Game Land all hunters (except raccoon and opossum hunters hunting at night) will be required to report to a check station before and after each hunt. On the Bladen Lakes State Forest Game Land, all deer hunters hunting during the gun deer season (except those hunting on the Breece and Singletary tracts) will be required to report to check stations. Biologists and technicians at the stations will record data on hunter harvest and success, age, sex and weight of the animal taken, and other information. This data will be a valuable aid to the Commission's wildlife management programs.

Other major regulations changes are as follows:

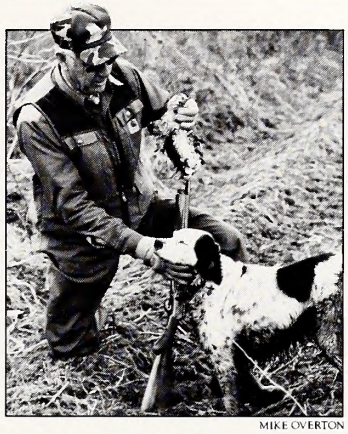
• Establish a deer season running from November 17 through January 1 in that part of Harnett County east of U.S. 401 south of Lillington and west of the Cape Fear River.

• Establish a gun either-sex deer season running from December 3-4 in Robeson County east of a boundary formed by SR 1004, NC 41, NC 211, SR 1620, SR 2225, NC 130 and NC 41.

• Establish a gun either-sex deer season running from December 3-6 in Anson County except game lands and the Pee Dee National Wildlife Refuge, Currituck County southeast of the Intracoastal Waterway except for the Outer Banks and Mackay Island National Wildlife Refuge, Guilford County north of I-40 and I-85, Randolph County south of U.S. 64 and west of U.S. 220, except game lands and in all of Alamance, Caswell, Chatham, Durham, Granville, Orange, Person and Rockingham counties.

• Establish a gun either-sex deer season running from December 3-13 in Duplin and Perquimans counties.

• Eliminate the season bag limit on quail while retaining the current daily bag and possession limits of 10 and 20 birds respectively.



MIKE OVERTON

***Harder To Find:*** *Declining quail populations have been a concern to hunters throughout the Southeast, a problem that will be examined at the new Hoffman Wildlife Research and Habitat Demonstration Area on the Sandhills Game Land.*

*Helps Finance Brochure*

## Quail Unlimited Chapter Donates

TERRY SHANKLE

***Helping Hand:*** *The Sanford Chapter of Quail Unlimited recently donated $443 to the Wildlife Commission. The donation will be used to help produce a brochure on habitat management for quail and rabbits. From left to right are Quail Unlimited members Bobby Lineberry and Mark Patterson along with Terry Sharpe, small game project leader for the Wildlife Commission, and Bob Lowder.*

## Landowners Help Save Roanoke

Dear *Wildlife*,

The Natural Heritage Program is delighted by Lawrence S. Earley's recent article, "Along the Roanoke Bottoms." The story of the Roanoke's bottomland forests is not complete without expressing appreciation for the private landowners along the river who voluntarily have protected large tracts of wetland habitats. A number of owners have placed their bottomlands on the State Registry of Natural Heritage Areas. We thank the McLennon, Temple, Fenner, Turner, and Bounds families with property in Halifax County, and the Hayes family with property in Bertie County for their commitment to natural areas protection. Also, Union Camp Corporation should be recognized for its donation of the Camassia Slopes preserve to The Nature Conservancy and conservation agreements for other exceptional tracts on the Roanoke and Chowan Rivers. We look forward to arranging voluntary protection agreements of our state's bottomland forests with other landowners.

*Charles E. Roe, Coordinator*
*NC Natural Heritage Program*

*Hiwassee Fishing Should Improve*

## Chopper Brings Fish Cover From Above

Heavy ice and snow during the winter of 1985 caused a multitude of problems for people in North Carolina. However, probably no one had more problems than Eddie Manchester, manager of the U.S. Forest Service's seed orchard at Beech Creek near Murphy.

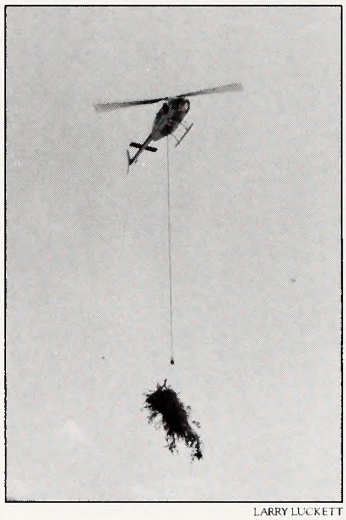
"We had almost 120 tons of pine limbs and tops damaged by the snow and ice" he said. "These had to be removed because of the potential for insect and disease problems in the orchard."

The most obvious solution was to burn the debris, but this seemed like such a waste with Hiwassee Lake only a mile away. Eddie is an avid fisherman, and knew that this brush would make great fish attractors in a lake that lacks natural cover. He also knew that a Forest Service helicopter used for fighting fires was stationed at nearby Murphy. He began developing a cooperative project between the Forest Service, Wildlife Resources Commission, and Tennessee Valley Authority. In addition, the Tri-County Bass Club, Murphy Power Board, and Hiwassee Hideaway, a private marina, also provided funds and materials for the project.

Brush bundles and tree tops were hauled to the lake using the helicopter, and workers on the ground directed the chopper to the "drop zones" for the artificial reefs. Once the brush was dropped, crews in boats weighed the bundles down with netting and rocks. In 20 hours flight time, 242 fish attractors were placed in the lake — an average of one every five minutes. It normally takes a crew of three to four men a half hour to place a single fish attractor in a lake.

Plans have been made to continue the project this year. Fishermen can look forward to improved fishing in Hiwassee Lake thanks to the cooperative efforts of government agencies, area sportsmen, and ice storms.

*— Larry Luckett*
*U.S. Forest Service*



LARRY LUCKETT

***Bombs Away:*** *A Forest Service helicopter was recently used to place 242 hiding places for fish in Hiwassee Lake. This fish-attracting cover is made of brush weighted with rocks and netting.*

*Donated Waterfowl Decoys*

## Lewis Remembered For Collections

Dear Wildlife,

It is with deep regret that I call your attention to the death on December 27, 1985 of James Spencer Lewis Jr. of Goldsboro. He was 81 years old and is survived by his wife, Virginia and son, James, III. He was a *cum laude* graduate of the engineering school at the University of North Carolina at Chapel Hill before the engineering school was moved to North Carolina State. Jim's life work was in construction, specializing in mountain highway tunnels and bridges. While extremely successful in his chosen field, he had many and varied interests, but was probably best known for his collections of decoys and Kentucky rifles.

Duck hunting was his favorite sport. In this connection he became a knowledgeable decoy collector long before the collection of decoys became a popular hobby.

Jim's specialty was North Carolina birds, having probably the most extensive collection in existence. He also had many very fine decoys from other makers, including some outstanding Wards! In addition to his personal collection, he had given a large selection of similar decoys to the Maritime Museum in Beaufort, North Carolina. These decoys will be on exhibition as soon as space is provided.

While Jim's decoy and Kentucky rifle collections are outstanding, the man himself was immeasurably more outstanding. He was always completely fair and honest, and was so appalled at some of the trends that have recently become prevalent in the decoy field — fake birds, misrepresentations, etc. — that he wrote a code of ethics adopted by the North Carolina Decoy Collectors Association, and now a standard throughout the country.

When Jim died, decoy collecting lost one of its truest supporters and I lost a good friend. I had only known Jim for five or six years. My regret is that I did not know him a great deal longer. He was that kind of fellow!

*— Bruce B. Cameron*

## "Flipping" Works For Largemouth Bass

One of the most effective techniques for catching bass is "flipping." This simple method of fishing puts the lure right where the bass live — around logs, stumps, and brush.

It works like this. Pull out 3 to 9 feet of line, depending on how close you can get to the structure. Then, strip off an extra arm's length of line. Swing the lure like a pendulum, but don't allow it to get too high or you'll lose control. At the back of the swing, flick your wrist so that the lure is propelled towards its target. Allow enough slack so the lure drops vertically to the bottom. Then, jig it a few times. If you don't get a strike, try another spot. Jigs and plastic worms both work well with this technique.

Here are a few other tips on flipping:

- Position your boat close to brush, trees and other structure. Try to work the jig back into the base of trees or bushes.
- Make sure the lure enters the water without noise, and allow it to fall freely. After a few seconds on bottom, twitch it to represent crayfish or fleeing prey.
- Concentration is extremely important. When the line twitches, set the hook hard. Then, man-handle the fish out of cover as quickly as possible. Once the fish is hooked, extend your arms horizontally to act as a "spring." This will prevent the line from breaking.

*Leave Beer At Home*

## Holiday Boating Calls For Extra Caution

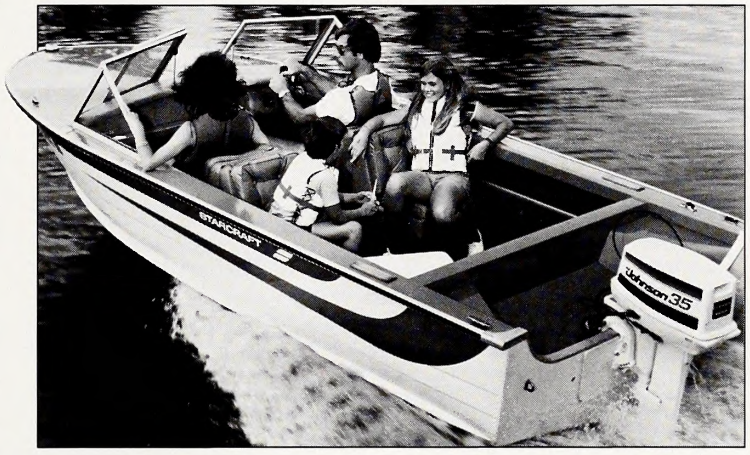
Summer brings thousands of boaters to North Carolina, and the weekend of July 4th is considered the busiest of the season. Officials with the Wildlife Commission offered tips to boaters to help them avoid any boating accidents during the holiday.

"If we could tell people only one thing, it would be to leave alcoholic beverages at home when they go boating," said Colonel Winfield Rhyne, chief of the Division of Enforcement of the N.C. Wildlife Resources Commission. "Studies nationally and in North Carolina show that a high percentage of the operators and victims in fatal boating accidents would have been considered legally drunk if they had been operating an automobile. Even small amounts of alcohol can slow a boater's reflexes and reduce alertness, especially after spending a day in the sun and wind. Bring plenty of soft drinks or other beverages to avoid dehydration in the hot sun, but leave the beer at home."

Rhyne adds that families with small children need to be especially careful. "All children and nonswimmers should be wearing Coast Guard approved personal flotation devices (PFDs) at all times. Also, be sure that children are under control and seated when the boat is underway. We occasionally see parents who let their children roam about or even sit on the tip of the bow when the boat is under way. This is extremely dangerous. It's not hard to fall overboard or be thrown from a boat at high speeds."

The number of boats on the water also calls for extra care and courtesy. "Be sure you're familiar with the rules of the road, and exercise them," added Rhyne. "Also, be courteous. Slow down for other boats, and give sailboats, fishermen, and water skiers plenty of room. It's also a good idea to not spend too much time on the water. It's surprising how tired you can be from a day's boating, and fatigue plays a big role in many boating accidents. Taking a break, and getting off the water for a few hour's rest during the hottest, brightest part of the day can be a big help."

Rhyne adds that reckless and drunken boating is a crime. These incidents can be reported (get the boat registration number if possible) to the Wildlife Commission's 24-hour toll-free Wildlife Watch Hotline at 1-800-662-7137.




***Keep Your Eyes Open:*** *Boating peaks during July, and this calls for a little extra care. Children should wear personal flotation devices and be kept under control at all times.*

*Dr. W.H. McCall*

## A "Hall Of Famer"

JANE ROHLING

***High Honor:*** *District 9 Wildlife Commissioner Dr. W.H. McCall of Asheville was recently voted into the National Bird-Dog Field Trial Hall of Fame. Dr. McCall has bird hunted for over 70 years, and been involved in field trials since the end of World War II. Here, Dr. and Mrs. McCall are honored at a meeting of the N.C. Field Trial Association.*

## The Wildlife Endowment Fund Report

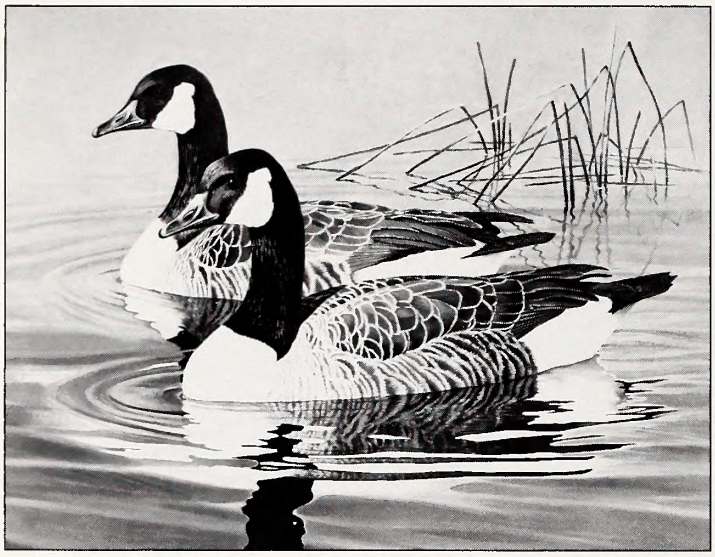
The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

**Status on March 31, 1986**

| | Numbers Sold | Revenue Received |
|---|---|---|
| Lifetime Sportsman's License | 16,511 | $5,004,185.32 |
| Lifetime Hunting License | 132 | 26,211.53 |
| Lifetime Fishing License | 1,025 | 183,635.06 |
| Lifetime Subscriptions to Wildlife in N.C. | 698 | 84,248.82 |
| Contributions | — | 70,530.51 |
| | Fund Total: | $5,368,811.24 |

*Print Orders Being Taken*

## Waterfowl Stamp Features Canadas



***Study In Grace:*** *The 1986 North Carolina Waterfowl Stamp, which features this painting of a pair of Canada geese by well-known wildlife artist Tom Hirata, is currently available from license agents. Orders will be taken for art prints of the stamp by local art dealers through August 31. Funds from the sale of waterfowl stamps and prints helped purchase several tracts of bottomland hardwood forest on the Roanoke River, which provide excellent habitat for waterfowl and other wildlife.*

## Calendar Of Events

**July 4**
11th annual Lumber River Raft and Canoe Regatta. For more information contact the Scotland County Parks and Recreation Department, P.O. Box 1668, Laurinburg, NC 28352.

**July 4-6**
Croaker Festival at Oriental. Sailboat races, fish fry, games, arts and crafts.

**July 5**
Independence Day Sailing Regatta at Edenton.

**July 12-13**
30th annual Grandfather Mountain Highland Games and Gathering of Scottish Clans. Traditional Scottish games, track and field events, and music.

**July 26-27**
The Oak Hollow World Fuel and Gas Championships will feature some of the world's fastest boats at Oak Hollow Lake. For more information contact the High Point Jaycees, 508 N. Hamilton St., High Point, NC 27262.

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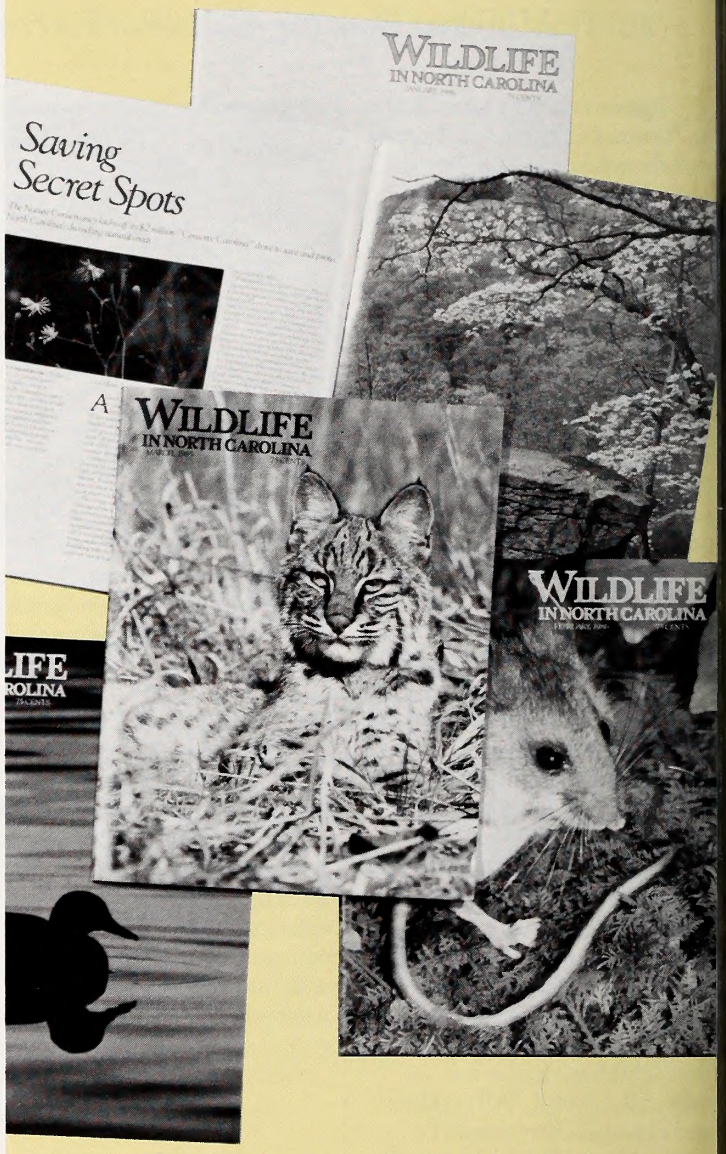


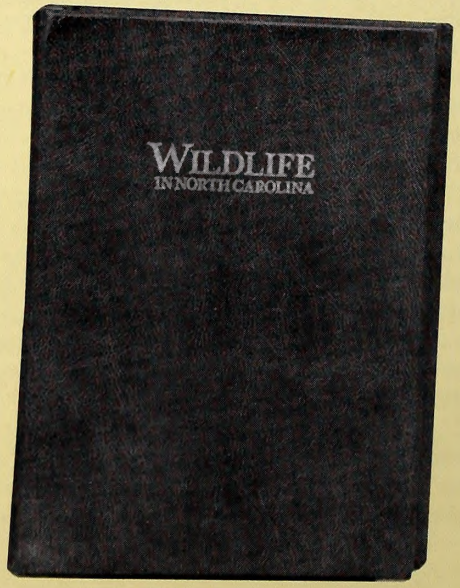

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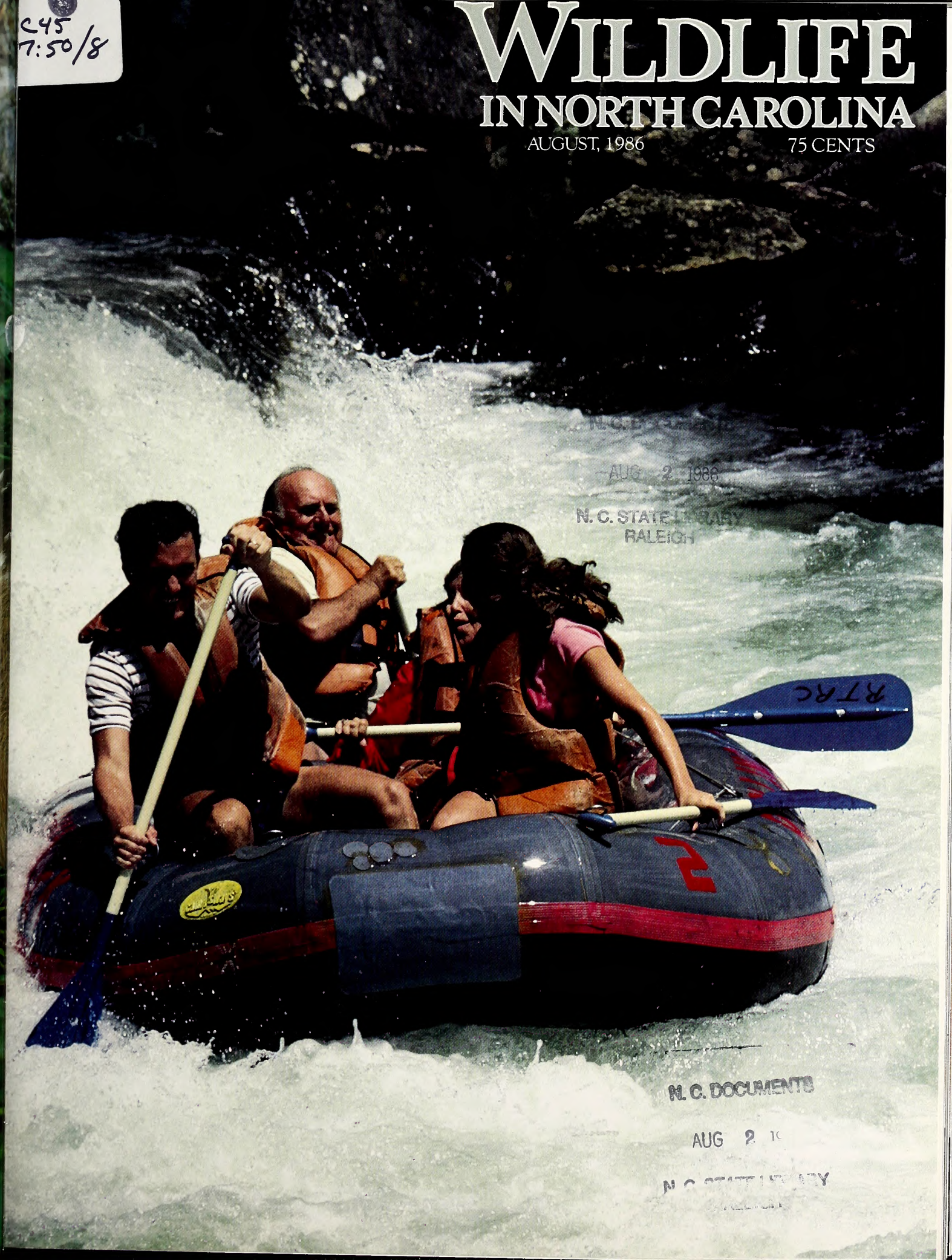


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# Shooting With Bone 'Narrows

*by Jim Dean*

No one seemed to be home when I stopped by a friend's house one recent afternoon, but I kept hearing strange noises from around back. Ping, thunk. Ping, thunk. I walked through the hedge and found Joe standing on one side of the yard shooting arrows at a target he'd mounted in front of a steep embankment.

"I didn't know you were an archer," I said.

"Well, some of the people I shoot with have made the same observation," he said, chuckling. "But to tell the truth, I've been at it for about two years now, and it's one of the most absorbing hobbies I've ever had. Mostly, I've been target shooting, but this year I'm figuring on trying to get a deer."

"One with suicidal tendencies, I would guess," I kidded.

"Without question," he agreed, "but it won't be because I'm short of gear."

He had aluminum arrows and a state-of-the-art compound target bow—one of those funny-looking jobs with wheels and wires. It was mounted with an elaborate sight and on the string near the nocking point was a button he called a "kisser." "You draw the bow until the button hits your lips at the same spot each time you shoot, and it helps you get the same draw and hold each time," he said. "Archery is a pretty sophisticated sport these days."

I'll say it is. I had a pretty rampant case of "bone-narrow" fever when I was a kid, but I haven't shot a modern bow like Joe's more than a few dozen times. Perhaps no sport associated with hunting or fishing has undergone more major innovations in equipment in the past 30 years than archery. You can still recognize and use the guns and fishing gear you grew up with, but if you could hand a 1950s archery buff a modern bow, he might not know what it was.

My father carried a boyhood interest in archery well into adulthood, and when I was old enough to shoot with him, he gave me a straight, lemonwood target bow with a 20-pound pull. You couldn't buy a recurved bow then, although history books were full of illustrations of recurves used in ancient times. Thirty years ago, virtually all bows were straight and made of hickory or lemonwood. The best were probably made of osage orange. Dad's bows were powerful longbows (of Robin Hood fame) and about 6-feet long with real horn tips. He made them from blanks, one of lemonwood and the other osage orange. Sadly, I broke the orange bow trying to string it, but I believe Dad has forgiven me. It's been long enough by now.

We ordered our supplies from L.E. Stemmler out of Manorville, N.Y., a company that apparently bit the dust just before archery became a boom industry. I still remember poring over those old catalogs looking at Port Oxford cedar arrow shafts, feather fletching and leather finger guards. Even today, I never smell beeswax without thinking of waxing a flax bowstring.

Of course, modern archery gear is far superior, but it would be a mistake to assume that a wooden longbow like my father's wasn't a lethal and accurate weapon. Without a leather armguard, it would peel the skin from elbow to wrist, and it took real strength to draw and hold it. It was also a flat-shooting son-of-a-gun, and it was no surprise to me when Howard Hill took his longbows to Africa in the 1950s to film the classic big-game hunting film, "Tembo." Hill bagged virtually every major species, including Tembo (elephant), with a longbow. Of course, you won't see that film in any theatre again.

As for me, I hunted mostly cardboard boxes which I'd stack up in the back yard. I'd stalk them from behind trees or shoot them Indian style as I raced past hanging from the neck of my Pinto. That's the way I saw it, anyway. If you'd been watching, you would have seen some grimy little kid in short khaki pants straddling a stick rather than a fierce warrior astride his faithful mount.

I learned a few facts about archery from those early years. First, don't shoot on a grassy lawn because arrows bury so completely you can't find them. Second, you don't need a target as big as a cardboard box after you get your "eye" and shoot instinctively. I could pick off bottle caps by the end of that summer. Finally, and most important, don't shoot straight up.

Once, at the edge of a field, I let a neighborhood kid shoot my bow and before I could say anything, he aimed straight up and let fly. We watched the arrow go out of sight, and then it occurred to us that we had no idea where it would come down. I could suddenly see myself shish-ka-bobbed from top to bottom, and you've never seen kids scatter so quickly. We never found the arrow.

Later on, Dad gave me a solid glass recurved bow, but it never shot quite the same as the old lemonwood bow, and although I tried to shoot some squirrels with it in the woods behind my grandmother's house, I never hit anything. I guess I really didn't want to shoot a squirrel with an arrow, anyway, I just liked the idea of hunting something more wary than a box.

Those memories came back a few weeks ago when I was in my parent's attic and saw Dad's old long bow hanging on two nails. I also recalled that once when I was very sick, he had read me his favorite book, *Robin Hood*. At the end of the book when he lay dying, Robin asked his friend Little John to hand him his bow so that he could shoot one last arrow. His last wish was to be buried where that arrow landed. I always liked that notion, but you can bet when my time comes, I won't shoot straight up. Who's in any hurry?

August, 1986
Volume 50, Number 8

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# WILDLIFE IN NORTH CAROLINA

*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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**Cover** *Nantahala rafters hang on as they negotiate a foaming section of white water. The Nantahala is fast becoming the East Coast's premier river for canoers, kayakers and rafters. Photography by Clay Nolan.*

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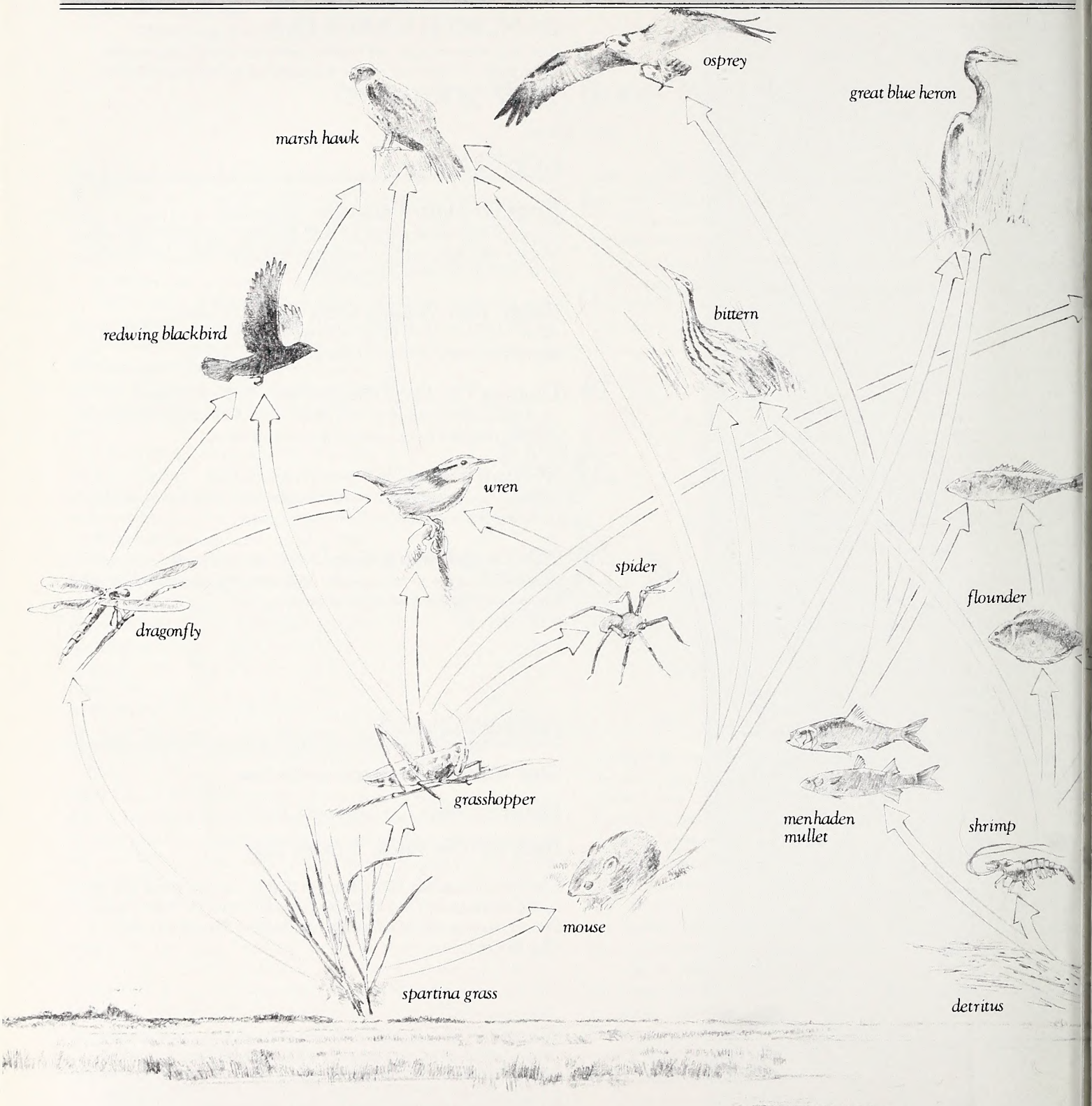
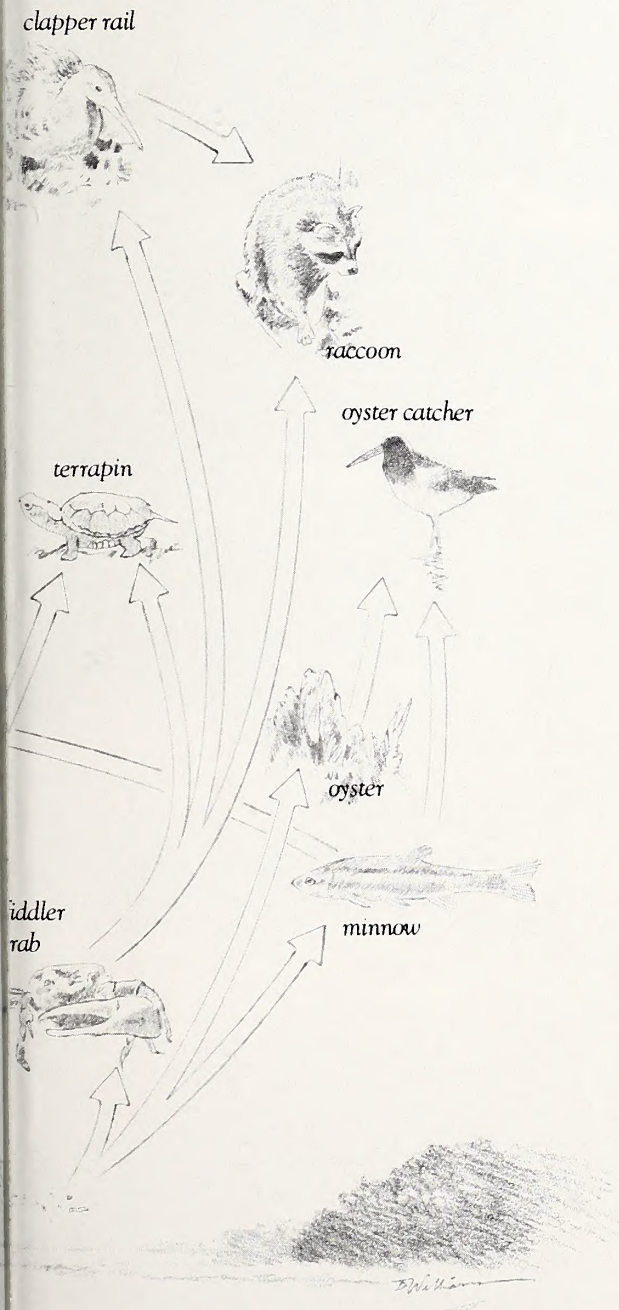



**Food chains are short,** *consisting of a plant and no more than two or three animals. They interconnect with each other, as the illustration shows, and become food webs. There are two kinds of food chains or food webs in the salt marsh. One is the grazing food chain that starts with the living spartina grass. The other is the detrital food chain that depends on decaying bits of grass, called detritus, suspended in the water column. Of the two, the detrital food chain is the more important to us because it includes most of our shellfish and food fish.*

# The Web Of Life

*written by Lawrence S. Earley / illustrated by David Williams*




Thinking about food chains can make us a little giddy, like climbing to the edge of a canyon and looking down. That's because food chains—or, more accurately, food webs—force us to consider nature's big picture. When we see the complex ways in which animals support themselves in an ecosystem, how vast their interconnections, we're no longer looking at individual lives but the marvelous web of Life.

Start with the grasshopper sucking the juice from a piece of spartina grass in a salt marsh. Suddenly a wren snatches the grasshopper to feed its nesting young. Later that day, a marsh hawk eats the wren. Grass, grasshopper, wren and hawk form a simple food chain, each linked to the others in a sequence of dependence.

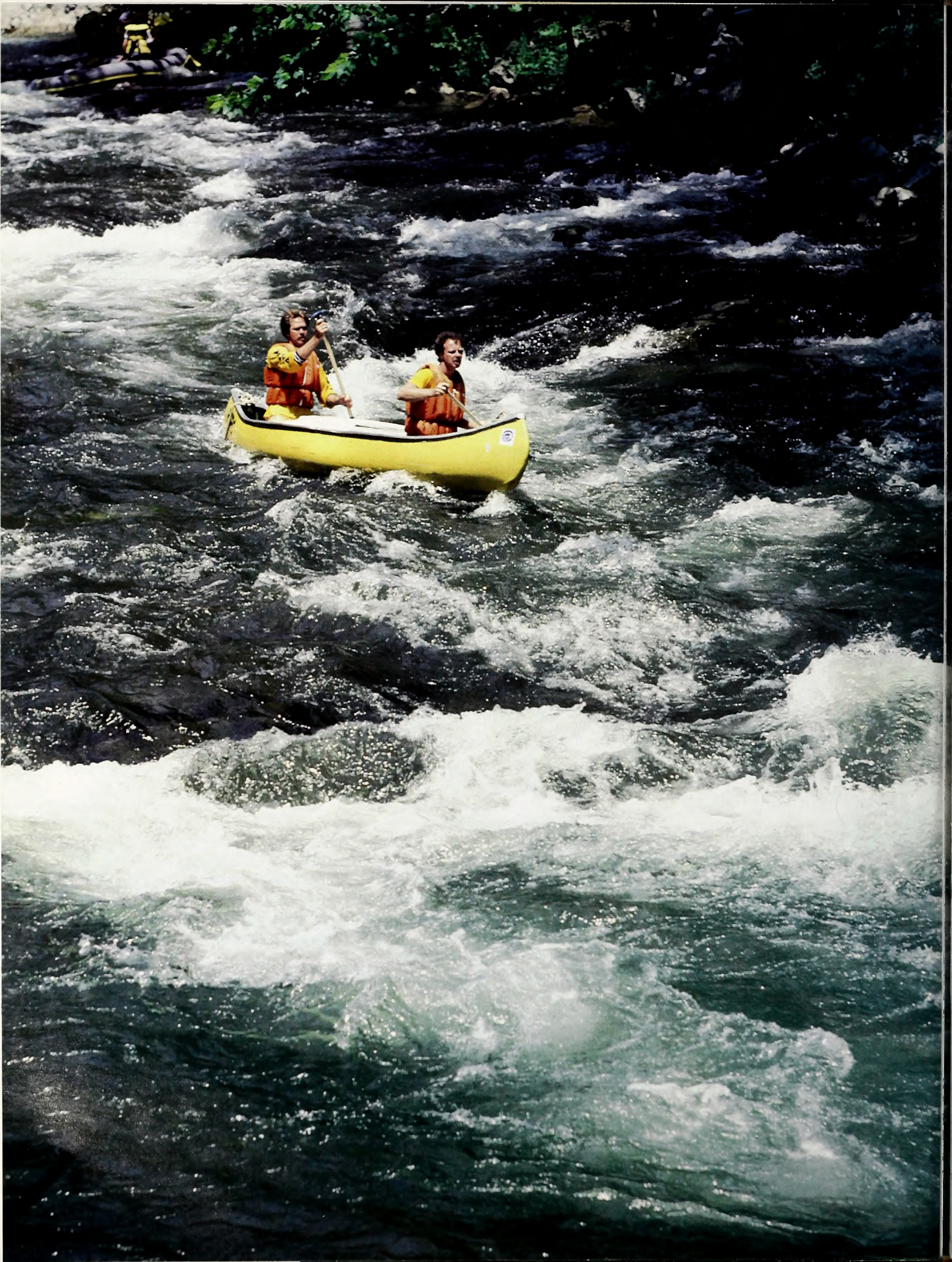
The basis of this and all food chains is the plant, which turns the sun's light energy into food energy. The plant plays the role of the producer in the marsh ecosystem, and the animals are consumers—the herbivorous grasshopper is a primary consumer because it feeds directly on the grass, the wren is a secondary consumer, and the hawk is a top carnivore or tertiary consumer. Although nothing preys on a top carnivore like the hawk when it is alive, it is food for other players in the ecosystem when it dies. Decomposers—tiny plants and animals in the soil and water—release nutrients in the hawk's flesh to be recycled by plants once again.

There are only four links in this chain, and indeed food chains don't come much longer than this. The reason is that there is a progressive loss of energy at every transfer point in the food chain. When the wren eats the grasshopper, some of the energy provided by the hopper is stored in the wren's flesh but a large portion is lost as heat. The same happens when the hawk eats the wren. Thus, the hawk gets less energy from the wren for its efforts than the wren got from the hopper. Since animals get larger and need more food the higher they are in the food chain, there is a practical limit to the number of links in a food chain.

The simple food chain we've looked at doesn't go far enough to describe each organism's relationships within and without the salt marsh ecosystem. The grass, for example, is also eaten by other insects, and the grasshopper is preyed upon by spiders. The wren eats hoppers, but also a lot of other insects. The hawk will eat a wren, but it'll take ducklings, mink and other animals in the marsh as well. And the hawk may not die in the salt marsh, but in an inland forest, thus providing food for creatures from an entirely different ecosystem. Each food chain connects with other food chains and widens inevitably into a food web.

To complicate matters, there's another kind of food chain in the marsh. The grazing food chain that began with the grass is actually less important than the detrital food chain, for most of the grass—up to 90 percent—dies unconsumed. These dead plants are food for decomposers that break the grass up into smaller bits, creating a soup of dead plant and animal parts called detritus. Suspended in the water throughout the marsh and estuary, detritus is eaten by mussels, clams, fiddler crabs, mullet, shrimp and the like, animals which in turn feed many other species, including most of our food fish.

Man, of course, is the top carnivore in most food webs, but he also plays a more humble part. For man also dies and becomes food for other creatures, another link in the web of life that connects all living and nonliving things.



# River Of Many Returns

The Nantahala River is popular with fishermen and rafters, and also supplies electricity to part of western North Carolina. Unfortunately, those uses are not always compatible.

by Kay Scott

The water was cold that July morning as the three of us slipped on our helmets and pushed our kayaks into the current. Brrrrr! Better not flip!

We left the Forest Service launch site about 10 a.m. Earlier that morning Nantahala Power and Light Company had turned the river on to generate power for its customers, particularly for all the air conditioners which would work overtime that hot summer day.

We passed hundreds of people in rafts; the colorful logos on the rafts demonstrated the array of outfitters dependent on the gorge, and the river, for their income. Entering a still pool we paddled left to avoid a fisherman braving the deluge of water and rafts. His quiet concentration seemed unbroken by our silent passage.

Later, as the mid-day sun crested the peaks and touched the water, my mind wandered a moment. Just then the rear of my boat slid sideways in the current under a small ledge. Over into the 45 degree water I went, another sacrifice to the river of the noonday sun—the Nantahala.

To thousands of eastern whitewater enthusiasts, tourists and fishermen, this area is Mecca. Or, so it would seem from the crowds who flock here during summer weekends. With them come many of the paradoxes that face this area and others like it in North Carolina. The recreational benefits of the river bring people, and people spend money which flows into the local economy. But it hasn't been an easy transition, and problems still linger.

Nantahala or "Nun 'daye li" in the Cherokee tongue, means mid-day and noon-day sun. It is named for the Cherokee Indian settlement once located at the point along its banks where the cliffs are most perpendicular. These cliffs block the sun from view until almost noon.

"Nun 'daye li" begins in the Standing Indian area of Nantahala National Forest, and flows 46.5 miles as a tributary of the Little Tennessee River. Almost 14 miles, a little more than one-quarter of this once wild river, lies impounded beneath the waters of Fontana and Nantahala Lakes.

According to ancient Cherokee legend, a great winged monster who lived in these hills swooped down and carried an Indian child to his home in the cliffs. The people gathered, asking the Great Spirit for help. They prayed until a bolt of lightning and tremendous clap of thunder shook the mountain. When the dust cleared, they could see the shattered mountain top where the monster had lived. It remains treeless to this day.

Among the remaining jumble of rocks stood a pillar of stone, an Indian sentry killed by the blast—the standing Indian.

The river flows along a relatively broad and level bed as it leaves the national forest and enters 2,000 acres of private lands in the Rainbow Springs area. Nearly seven miles of the river flow through this private property. Almost 100 years ago this area was an important tourist center in much the same way that the Nantahala Gorge, farther downstream, is an important recreational resource today. The Littleton Hotel, the first hotel in Macon County, was located near Rainbow Springs.

"The tributaries of the upper Nantahala have some of the state's best wild trout fishing," says Mallory Martin, fisheries biologist for the N.C. Wildlife Resources Commission. Local residents agree, and fish for rainbow and brown trout from Nantahala Lake to the native waters in the Standing Indian area of the national forest lands.

Nantahala Lake, also known as Aquone Lake, was developed by NP&L to provide electricity, and fishing and boating opportunities abound on this lake. Its deep waters provide good habitat for kokanee salmon, which make a fall spawning run upstream into the Standing Indian area. The dam and powerhouse were completed in 1942. In conjunction with two smaller lakes, Nantahala provides enough water to generate the energy of two 50,000-pound locomotives traveling at 50 miles per hour.

Power is generated when water plunges from the bottom of the lake through a pipeline and tunnel to a powerstation in the Nantahala Gorge. The pipeline, 8½ feet in diameter, leaves the dam and connects to a tunnel. This tunnel, 13 feet in diameter, extends approximately five miles through solid rock to the powerhouse.

Construction of this system of pipes and tunnels to provide hydropower diverted the Nantahala River's water from several miles of its original course. Today, this dewatered section of the river is fed by smaller creeks and streams such as Otter Creek and Whiteoak Creek. Fishermen and photographers enjoy easy access to the scenic river provided by State Road 1310 and Forest Service Road 308.

"During the next couple of years the U.S. Fish and Wildlife Service will conduct minimum in-stream flow measurements along this dewatered section of the Nantahala," says Martin. "After this study, the Wildlife Commission and NP&L will begin negotiations to agree on increased, but limited releases of water from the dam into this section of stream and if this occurs, it will improve fishing in this area."

After the river leaves the powerhouse and re-enters its original course it makes a sharp right turn. According to Steve Yerkovich of the Earth Sciences Department at Western

***Canoers test their skills** against frothing white water of Nantahala River. About 130,000 canoers, kayakers and rafters used the river in 1984, making it one of the East Coast's most popular whitewater rivers.*

*"The Nantahala is beginning to suffer a lot of damage to its physical environment. The river bank is becoming eroded. There is also a problem with sanitary facilities, and there are simply not enough public toilets in the gorge."—Lewis Kearney*

Carolina University, "The Nantahala selected this particular channel, and makes that sharp turn, because it found a bed composed of easily erodible rock, Murphy marble. The rocks on either side, quartzites, are more resistant to weathering and form the steep gorge walls. This is an entirely different situation from what you find along the rest of the river."

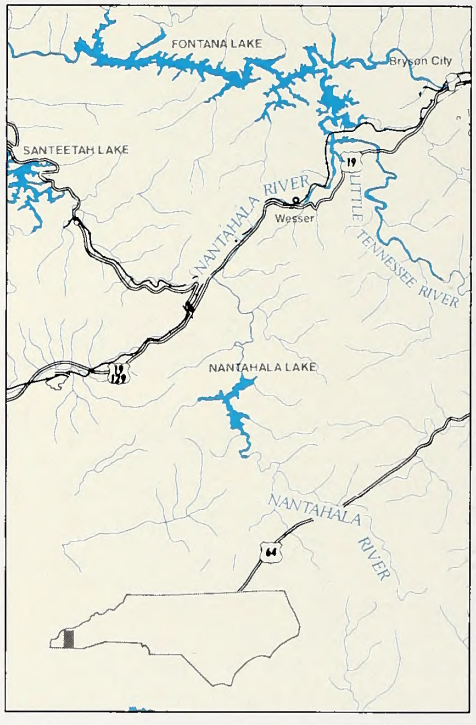
Here begins the true land of the noon-day sun, an eight-mile stretch of gorge that affords one of the premier whitewater float stretches in the East, attracting rafters from throughout the country.

Without controlled water releases from the power facility the whitewater opportunities on this river would be limited primarily to periods of high water, and these uncertain periods would not be reliable enough to support the whitewater industry present in the gorge. In addition, the cold, oxygenated water churning from the bottom of the reservoir provides superb trout habitat.

Fred Alexander, manager of corporate communications for NP&L, views this as a "happy confluence of circumstances. The power needs of our 40,000 customers peak during the day. Fortunately, this is at the same time the outfitters need the river to be 'on' so that their boats and rafts can run the river. Beginning each Thursday, we give the weekend forecast of our generating schedule. Of course, this is subject to change based on the energy demands of our customers and mechanical conditions. However, as much as possible, we want to cooperate with the outfitters and other boaters wishing to use the river." (River flow information is available by calling 704-321-4504.)

Most of the land in Nantahala gorge is owned and managed as a part of Nantahala National Forest. There are about 25 private landowners in the gorge, including motels, campgrounds, snack shops, outfitters, a quarry operation and several summer homes.

"The Forest Service seeks to manage public lands in the gorge in a safe and sanitary manner, and in such a way that these lands will provide all users with a quality experience," says Lewis Kearney, District Ranger, Wayah District, Nantahala




National Forest. "We look at the Nantahala as a Southeastern treasure and we want to manage this river so that it will continue to be a treasure.

"The Nantahala is a family river that even children and grandmothers can safely enjoy," says Kearney. "U.S. Highway 19 flanks the river on one side and the railroad runs beside it on the other. Folks feel that if they do get into trouble on the water, they can easily get out to the highway. This gives them a sense of security. The odd thing is, once you get on the river, you have so much fun that you forget the highway and railroad." Public use of the river has been growing at a tremendous rate. Payson Kennedy, founder of Nantahala Outdoor Center, the first outfitter on the gorge, estimates that the center had about 800 customers during 1972, their first year of business. In 1984, the Forest Service estimates that approximately 130,000 people canoed, kayaked, rafted or tubed the river, and this figure does not include tourists, sightseers or fishermen.

"The Nantahala is running neck in neck with the Youghiogheny in Pennsylvania as the busiest river in the East, and perhaps the nation," Kearney said. "The Nantahala is beginning to suffer a lot of damage to its physical environment. The river bank is becoming eroded. We have a huge traffic problem. If we aren't careful, the river itself will become littered with cans and bottles. There is also a problem with sanitary facilities, and there simply are not enough public toilets in the gorge, therefore people run to the bushes."

Businesses in the gorge share this concern. In 1981 the outfitters formed the Nantahala Gorge Association to encourage "reasonable and orderly recreational use of the gorge and river; to make the gorge an attractive, enjoyable, safe place to visit; and to preserve the natural environment of the gorge, as much as possible."

Working with these businesses, the Forest Service began to issue permits to outfitters, and the permits limited the number of commercial customers on guided raft trips in 1983 and in the following years.

"As a result of the astonishing growth, we had a tiger by the tail," Kearney said. "By the time we decided to go with a permit system, it was like entering the ballgame in the 9th inning. We now permit 15 commercial ventures to guide raft trips on this river, and we shoot for a maximum of 3,360 visitors per day on these trips on peak-use weekends during summer. However, this number does not include private boaters and those who "tote 'n float," renting a raft and taking an unguided trip down the river. It also does not include other visitors such as sightseers and fishermen."

Indeed, it is tremendous growth. On a summer weekend you can almost walk across the river on the rafts and never get wet!

"I have mixed feelings about this growth," says Kennedy. "It is good to see this many people enjoying the river and whitewater sports. Our objective in starting this business was to introduce people to whitewater. However, we would like to see the use of the river spread out more."

How have the other river users fared during this time of intense growth? What of the fishermen using the river that Gerald Almy, in his 1983 *Sports Afield* article, called "the queen of North Carolina's trout waters, a diamond bright fishery that sparkles with quality."

"I haven't heard much conflict this year," says Mallory Martin. "But, in the past, fishermen have griped about it." In fact, this situation prompted the Wildlife Commission to allow night fishing on the Nantahala, and the Nantahala is the *only* trout stream in the state where this is legal.

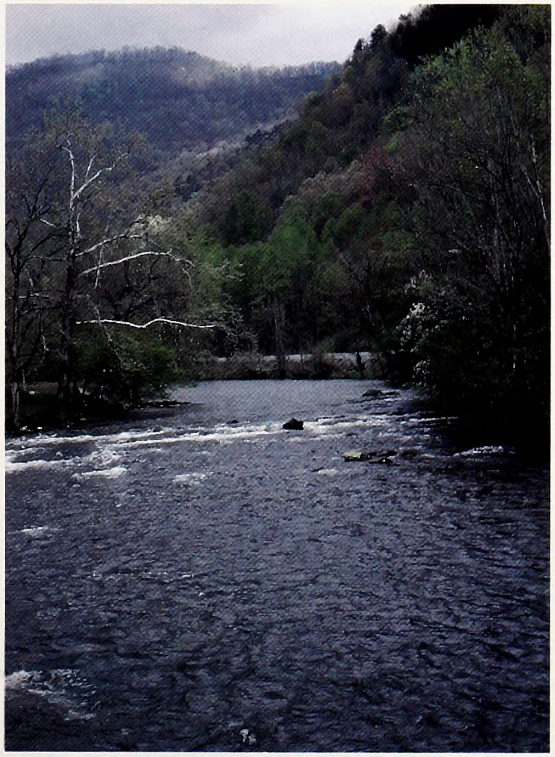
"Boating activity coincides with water releases," explains Martin. "It's much harder

JOEL ARRINGTON

to fish during those times of high water even if there were no boats on the river. Before night fishing was permitted, fishermen were left without a time to fish the gorge. Night fishing was allowed in order to ease the tension, and it has somewhat, but I don't see it as a solution to the problem."

Kearney sees the conflict between boaters and fishermen differently. "With whitewater use on the Nantahala heavy only in July, August and part of September, fishermen still have eight other months to use the river without being bothered by the boaters." (Trout fishing, however, is not permitted from March 1 until the first Saturday in April.)

Fishermen seek mostly rainbow and brown trout (some brook trout are also stocked) in the Nantahala's waters. The almost daily rush of water from the powerhouse flushes the river of silt and keeps water temperatures cold and favorable for trout. The gorge, downstream from the powerhouse, is regularly stocked throughout the season by the Wildlife Commission's Division of Boating and



***Trout fishermen** (above) as well as river runners like the Nantahala, but anglers have griped about the load of canoe and raft traffic. Night fishing has eased the tension somewhat. At left, breathtaking scenery accompanies whitewater enthusiasts on their excursions down the Nantahala Gorge.*

*"The governments and businesses of Swain County recognize the tremendous resource of the Nantahala Gorge and also the tremendous challenges associated with adequately managing this resource."*

N.C. TRAVEL & TOURISM

***Kayak race draws entrants** from around the country. Nantahala River is renowned nationwide for its eight-mile stretch of white water. Heavy public use of the river pumps dollars into local economy, but causes conflicts as well.*

Inland Fisheries. Upstream, in Standing Indian, the trout population is largely self-sustaining from natural reproduction.

Growth in the Nantahala Gorge has been a boon to Swain County's economy. Almost 80 percent of the total land area of this county is held in public ownership—national forest and national park lands—and this public ownership does not generate direct tax revenue. Therefore, the contributions of the gorge businesses are important.

According to a 1984 report published by the Department of Natural Resources and Community Development, "The whitewater industries contribute significantly to Swain County's limited tax base and employment rolls." (Unemployment in Swain County has recently been as high as 30 percent). The involved governments and businesses recognize the tremendous resource of the Nantahala Gorge and also the tremendous challenges associated with adequately managing this resource. During 1985 the Nantahala Gorge Area Coordinating Council was formed. Composed of representatives of the U.S. Forest Service, Nantahala Power and Light Company, Swain and Macon counties, and the State of North Carolina, it serves as the central coordinating body to study the gorge and its problems. The council has appointed three task force groups to study the most pressing problems that have been identified in the gorge: river use (numbers of people who may use the river at any one time), safety and lack of adequate public facilities.

"So far, the silent majority has been pretty silent," states Kearney. "I put the 'hard' boaters, the canoeists and kayakers, in this category. They have not really let their wishes be known while some of the commercial operations on the river have." Obviously, all river users—canoeists, kayakers, rafters, fishermen, landowners, commercial operations, tourists and area residents—will have to live with the consequences of these important decisions.

Today, boaters and rafters using the gorge put-in at the public launch site located on Forest Service property or use the private access which is leased to several outfitters by NP&L. After eight miles of exciting whitewater, culminating at Nantahala Falls, also known as "Lesser Wesser," users take-out at Nantahala Outdoor Center or at the Forest Service take-out just downstream.

Nantahala Falls offers a favorite viewing spot for whitewater activity. During whitewater races, or on weekends of heavy use, spectators, like vultures, line the banks on both sides of the rapid waiting for the inevitable, unplanned "swims" as river runners test their skill in this Class III water. After the water is turned off by NP&L, fishermen gather along this same stretch for trout fishing.

A quarter mile past "Lesser Wesser," the river rushes through one final rapid on its descent to Fontana Lake. This is Big Wesser Falls, until recently considered too dangerous to run. At least one rafting company has offered guided trips down this rapid. The danger from this rapid comes because it is man-made. Sharp rocks and tricky currents threaten paddlers who fall from their boats.

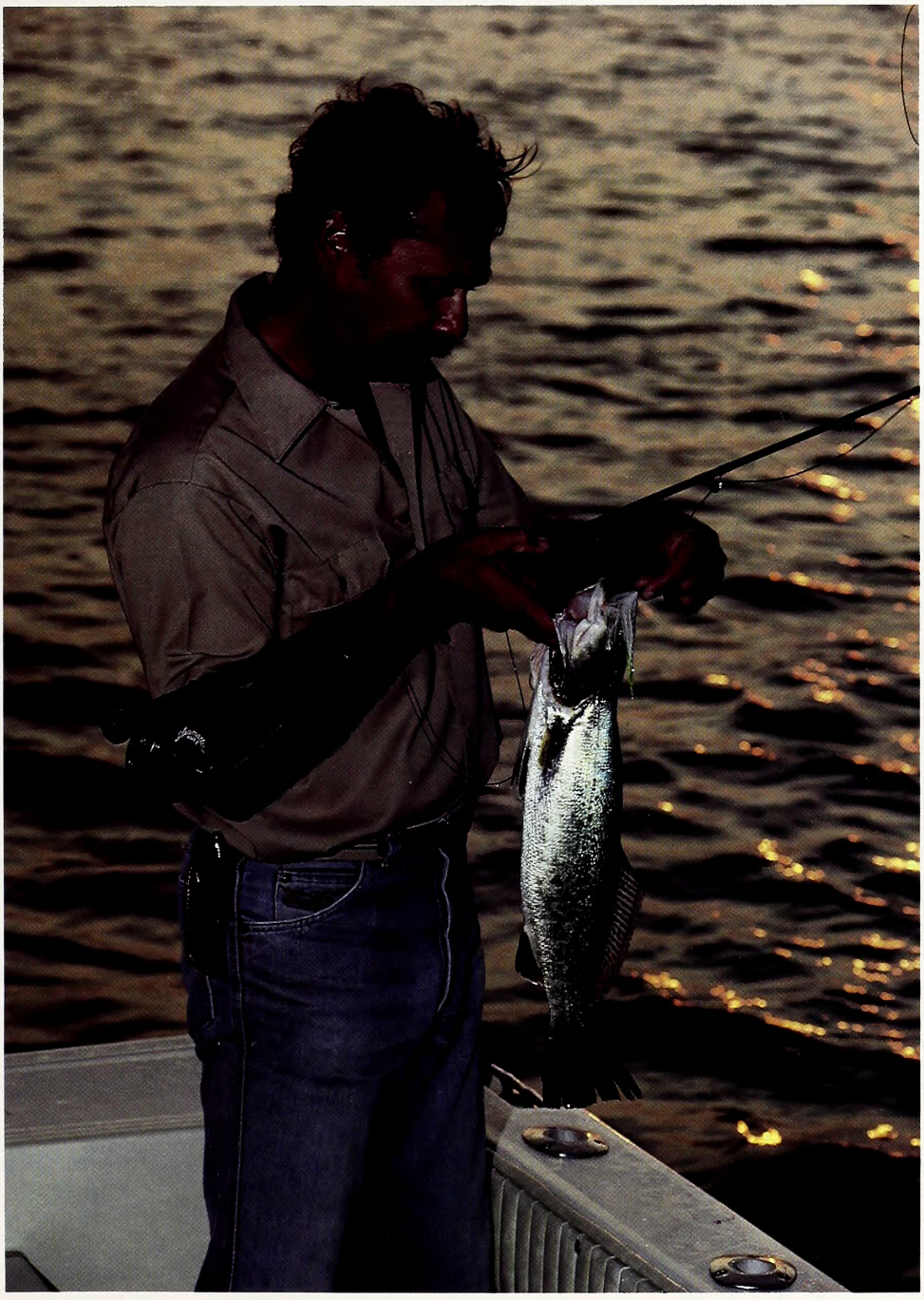
Two theories exist concerning the origin of this rapid. When the railroad was being built, there was a shortage of steel for two bridges needed to cross a meander in the river. So, instead of building the bridges, engineers blasted through the meander, creating a new waterway, Wesser Falls, and closing off the previous river course with fill to support the railroad. The second theory is that a hydroelectric project was planned between Wesser Falls and Fontana Lake and the falls were engineered to facilitate development of this project.

Below Wesser Falls, the river travels only a short distance before entering Fontana Lake. Here, along the bottom of the lake, the Nantahala meets the Little Tennessee.

Residents and users of the Nantahala Gorge, and indeed the entire river, face many of the same questions the rest of this state is encountering in this decade of intense development. However, this is probably the first time that Tar Heels have had to deal so graphically with multiple-use and multiple-need of our state's water resources.

Hydropower is an inexpensive source of electricity. It provides good economic incentive for industrial devleopment in these revenue-poor mountain counties. (The Nantahala hydroelectric facility supplies 40 percent of the company's generating capacity.) Concurrently, the same water resource supports an important segment of another local economy—the whitewater industry. And other river users, such as the fishermen, seek their fair share of this water resource.

It will take time before an assessment can be made of the true effects of increasing public use of the Nantahala. Meanwhile, the river watches, and runs its course to the Mississippi and the sea. When the Cherokee's noon sun touches these waters in the coming decades we can hope that our decisions about North Carolina's treasure, the Nantahala, will have been the right ones. ⊠



**Speckled trout** *begin to show up around inlets in late summer.*

# Bright Fish, Golden Days

*August may be a slow month for most freshwater fishing, but there's good fishing along the coast if you know how to find it.*

*written and photographed by Joel Arrington*

***Surrounded by fishing,*** *these beachcombers can fish the surf for late summer species, or go on the pier for even greater variety.*

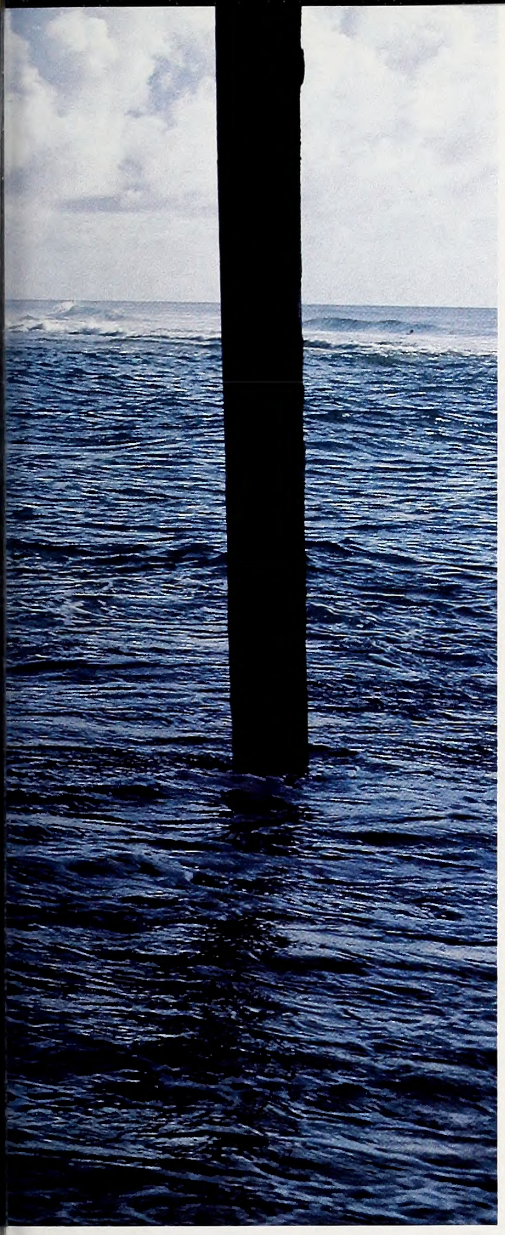
Driving across the ripening Coastal Plain in late summer, skiff in tow, your preoccupation is weather. It is a time of year, paradoxically, when you can have some of the loveliest and some of the worst. Fishermen, like the farmers whose half-cropped tobacco and yellowing soybean fields you drive through, are utterly at the mercy of it.

The most we can do is cultivate a philosophical attitude toward changes for the worse, be prepared to abort the trip when necessary and be thankful for clear skies and light winds whenever we find them. About half my post-Labor Day fishing excursions have been blown out over the years, but there have been some to write home about, too.

Standing on the porch at Oregon Inlet Fishing Center one September, we watched the previous day's marlin release flags popping on the outriggers of the sport-fishing fleet that was forced to remain home that day because of high winds. Capt. Tony Tillett suggested we try for gray trout under the bridge. Someone threw a cast net in the harbor and came up with maybe two dozen menhaden.

Tony worked the "Carolinian" seaward of the bridge pilings in a fast tidal rip. As instructed, Garvey Winegar and I hooked the fresh dead menhaden through the lips with 2-ounce jigs on monofilament leaders behind 6-ounce trolling leads. We needed to get the baits down 13 to 15 feet beside the pilings in the fast current. Right away, we began to catch gray trout that averaged 7 pounds. After several on the heavy boat rods, I cast 2-ounce jigs on 12-pound test spin and was able to get deep enough by throwing upcurrent and allowing the unbaited lure to wash back and sink. Those were some of the better gray trout I have caught in North Carolina, several of them going over 9 pounds. This was on a charter boat just trying to make the best of a bad day, but anyone in a small private boat could have done the same thing.

You still can, although there may not be as many of those big fish today as in 1978. Gray trout congregate on structure of all kinds near Outer Banks inlets in late summer before migrating to the ocean for the winter. At this same time of year, deep channels in eastern Pamlico Sound and Core Sound may hold schools of somewhat smaller fish. You can run westward out of, say, Avon or Buxton until you reach about the 18-foot depth line. Drift while jigging near the bottom a metal lure such as the No.



*Shallow, turbulent water on outer inlet bars and similar rough water on cape shoals may be the preferred locations of Spanish mackerel late in the summer until the first cool northeaster.*

3 Hopkins or Stingsilda or a ½-ounce jig head with long plastic tail. Of course, some areas are much more productive than others and you will need to search or get local advice to find them.

Puppy drum, too, begin migrating out of the sounds in late summer and by September may be concentrated around inlets, including the deeper channels that drain inlet shoals, both inside and out. Often inlet islands, such as the ones that have formed in recent years in Ocracoke Inlet, are ideal fishing locations for these small to middle-sized red drum. With care, you can run a skiff out to the islands, pull it up on the shore and spend the night; that is, if you're sure the islands aren't flooded by high tide. You may find the fish feeding on any tide, but most often on the flood late in the afternoon and at night. Most anglers use fresh cut bait anchored with a lead pyramid here in the turbulent inlets. Inside, jigs, spoons and plugs will produce too.

Speckled trout are often thought of as a fall fish, and they are caught less in late summer than after the first frosts of October when schools exit the sounds and forage along the beaches. But virtually all summer and particularly after Labor Day when cooler water temperatures are more conducive to fishing, speckled trout are available to anglers on the vast shoal complexes of eastern Pamlico Sound and other estuaries to the south.

Lower Core Sound near Bardens Inlet has been productive of speckled trout, in some years starting in August. Here or elsewhere in North Carolina sounds you should anchor your boat in a slough that drains a large grassy shoal. The water could be only a few feet deep. Fish will come up the slough on rising water to disperse and feed over the shoal. At high water, your success may fall off while fish are scattered over a large area, but may pick up again as the tide ebbs and fish begin to drop back into the slough.

Speckled trout sometimes form dense schools, but more often in the sounds they seem to be loosely organized, coming through in waves, seldom (in recent years anyway) very many together, and all of about the same size. Three- and 4-pound trout are commonplace in North Carolina waters these days, but anything over 5 pounds justifies a celebration.

Late summer trout will readily take artificials. MirrOlure plugs and plastic-tailed jigs practically have a monopoly on speckled trout lure sales, but the spotted lovelies will hit a variety of artificials, including topwater plugs. My recent favorite is the Bagley Jumping Mullet which so resembles an injured popeye fingerling that you can't fish it if there are any sea birds about because they will hover over it constantly and try to pick it up.

I don't know why so few speckled trout are caught on bait here when so many are taken on live shrimp elsewhere. One reason could be that trout hit artificials so well in North Carolina that expensive live baits are not necessary. Another is that live baits can be bought in so few places in North Carolina that hardly anyone could fish them if they wanted to, unless they caught them themselves. The truth is that both live minnows and live shrimp are deadly on trout anywhere, but artificials are less hassle and, to some anglers, more fun.

***Spanish mackerel fishing*** *often peaks in late summer, and anglers catch them on jerk baits from piers, and also in the surf on long metal lures retrieved rapidly.*

Casting to speckled trout in these same sloughs through the estuaries, you are likely to catch flounder and bluefish. Only an occasional flounder will get itself snagged as it attacks your artificial lure, but if you drift these natural channels with a live or fresh dead minnow on the bottom or with a strip of shark or flounder belly, you will score higher. Flounder tend to run larger in late summer than earlier in the year. Some of the very biggest come from such brackish water as the Cape Fear River mouth near Snows Cut. These doormats—some exceeding 10 pounds—can lie on dark bottom near creek mouths where they can bushwhack bait that washes out of the marshes.

The most dependable late summer species is likely to be bluefish—not the giants that will arrive in late October and November, but local snappers or Taylor blues up to about 6 pounds. These fish are an invaluable recreational resource to thousands of North Carolina anglers, providing

*Virtually all summer and particularly after Labor Day, when cooler water temperatures are more conducive to fishing, speckled trout are available to anglers on the vast shoal complexes of eastern Pamlico Sound and other estuaries to the south.*

***Bluefish up to 6 pounds** are sometimes common in late summer, and plugging for them on light spin tackle with topwater plugs is a highlight of the season.*

***Though speckled trout** are more commonly caught later in the season, they are moving out of the estuaries in late summer, and you may find them over grassy flats inside the barrier islands or around inlets.*

some of the best sport and food value of all salt water fish species. Not everybody likes to eat bluefish (all the more for those of us who do) but no one disputes their sporting qualities. Vicious strikers, determined fighters and often plentiful around the inlets and along the beaches, bluefish provide more recreation for more salt water anglers in North Carolina and along the Atlantic Coast than any other species.

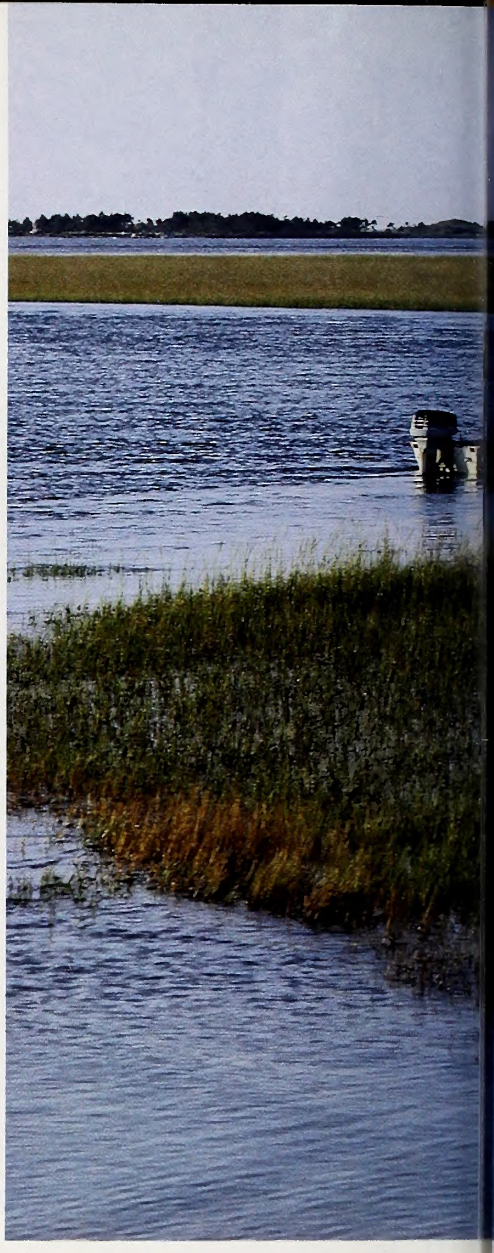
Rig yourself an 8-inch leader of hard 30-pound test mono or light wire and attach a ⅛-ounce, maybe ½-ounce, topwater lure. This should be on light plug tackle or one-handed spinning gear balanced for 8-pound or 10-pound test line. Keep this rod handy while casting for trout or drifting for flounder, and when you see bluefish swirls or bait showering out as you fish, cast your surface lure for almost guaranteed action. If you anchor near the edge of a slough at a marsh shore or a shoal where blues can trap bait, you will have more casting opportunities.

Take special precautions when fishing close to the outer bars of inlets, but this turbulent water is where you are likely to find schools of snapper blues. You may like to troll Clark Spoons or cast ⅜-ounce Krocodiles or small Hopkins lures, but mono will produce more strikes.

The same shallow, turbulent water on outer inlet bars and similar rough water on cape shoals may be the preferred locations of Spanish mackerel late in the summer until the first cool northeaster. These fish come up from Florida and last year they migrated at least as far as Oregon Inlet. Many went into the sound and were caught around the bridge over Croatan Sound. That is getting close to largemouth bass habitat.

In most years, however, you can count on them over cape shoals and artificial reefs. The traditional—and highly effective—method of fishing for them is trolling with Clark Spoons on long (up to 25-foot) mono leaders behind 6-ounce trolling leads. You can also cast such metal lures as Stingsildas, Conners and their clones up to about ½ ounce. Use line not over 10-pound test and reel as fast as possible.

This same technique, but with 9-foot, light surf rods is used along the south beach at Cape Hatteras. It is one of the few consistent spots I know of for surf fishing for Spanish mackerel. Here you often must cast over 200 feet to birds and fish that are showing in bait. It can be done effectively only with approximately 10-pound test line. Some years there are false albacore working the small bait along this shore, but generally they like the cooler water of spring and fall.



At times, Spanish run large enough to take sizable live baits. Slow-trollers after king mackerel have more than once been surprised to catch hefty Spanish on 5-inch bunker. Some of the king mackerel Mike Holleman and I caught last summer were smaller than our Spanish, but that's unusual.

By September, king mackerel fishing is getting better and the fish are getting larger. Live baits pulled ever so slowly on light tackle are accounting for more and more kings in North Carolina as more anglers are seized by the slow-trolling mania that is sweeping the state and region. Clearly not just a fad, the technique has spawned more tournaments and sold more boats, tackle and bait tanks than anything since fiberglass.

Serious king mackerel anglers get in gear late in the summer and continue as long as

***Some of the best*** *late summer fishing for trout is in the marsh cuts and holes behind the barrier islands. Blues, flounder and other species are also caught here and especially near inlets.*

weather lets them, sometimes into December. Plenty of Tar Heels like to pull hardware for kings, so spoons and jigs still probably account for more fish than live baits, but they tend to be the smaller, school fish rather than the smokers that seem to run alone or in small packs. You still see live baits fished under a cork or balloon, too.

Another Florida migrant of late summer is the pompano. You can pay a handsome sum to have a restaurant cook one in a paper wrapper, but you can sometimes catch lots of them in the surf in August up until the first northeasters of September. If you see any sign of mole crabs (sand fleas) nearby, dig them from the surf, particularly looking for soft ones that have shed or are about to. Pick a soft one or peel one that is cracking and bait a No. 2 or 4 hook with it. You'll need just a light pyramid sinker to hold bottom just behind the curl of gentle waves that break on the beach. You want to fish close. Pompano are tough customers on any decent tackle and one of the great table species, if you like fish that taste like fish.

Tarpon, unlike pompano, are tough customers on any tackle. We don't get small tarpon in North Carolina. Most go over 40 pounds and they are difficult to catch even when you have repeated opportunities to try. We sometimes get a few opportunities and usually they occur in late summer. Tarpon migrate up our coast, both inside and outside the barrier islands, into Pamlico Sound and as far as Chesapeake Bay. The most consistent location for them has been Frying Pan Shoals at Cape Fear.

Fishing pressure for them is sometimes intense there and too many boats have been known to spook them off the shoals for days at a time. A party of which I was a part once caught some on cut bait fished on the bottom, but I have talked to anglers who have caught them on live pinfish and on lures cast with surf rods.

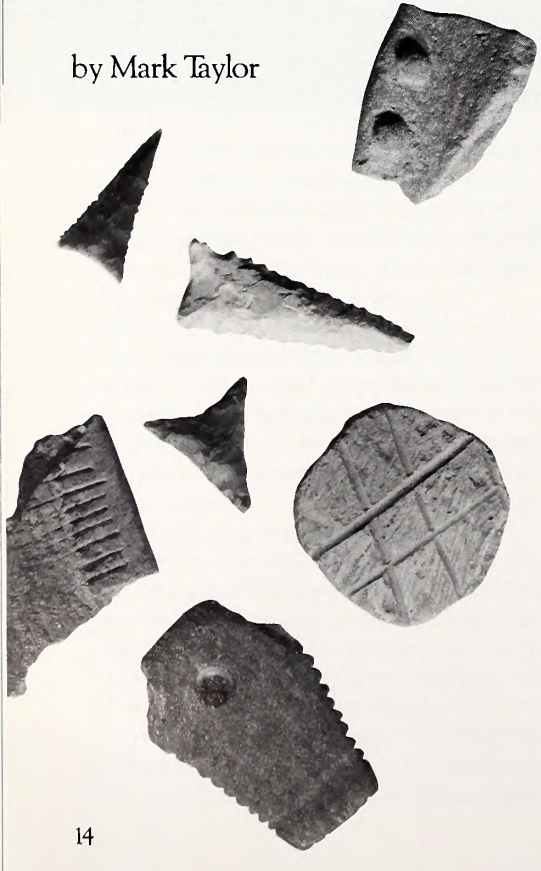
At this same location in September, we caught red drum weighing in the mid-thirties and some acrobatic spinner sharks. There was not a dull moment, but I have reports of slow fishing there when boats jammed the prime locations close to the cape point.

After Labor Day, cold fronts with high winds come through in waves. However, despite unstable weather regimens, late summer fishing along North Carolina's coast can be among the best anywhere and perhaps the most pleasant of any time of year. Certainly there is no lack of variety. Flexibility and careful study of national weather maps will help time your trips to coincide with good weather. ⊠

# Digging Up The Distant Past

Archaeologists are learning a lot about North Carolina's history by studying clues left by our earliest human inhabitants.

by Mark Taylor



Even in early April a cold wind sliced across Lake Phelps as we headed towards the distant shoreline. The prop of the 20-foot McKee started cutting sand below the crystal-clear waters, and the boat's keel ground on the bottom. "End of the line," said Richard Lawrence, as he and Leslie Bright jumped over the side. The rest of us followed carrying armloads of surveying equipment toward the shore.

Lawrence and Bright are underwater archaeologists at Fort Fisher with the Archaeology Branch of the N.C. Division of Archives and History. They had come to the lake to salvage and preserve an Indian dugout canoe that was discovered last fall by a state parks naturalist as he was bird-watching. Shifting sands had covered the dugout in the knee-deep water, but we soon relocated it with the surveying equipment.

After two days of painstaking work, all of the sand had been cleared from in and around the canoe. This dredged material was also screened, and small bits of wood and vegetative matter were preserved. This material can be carbon dated and analysed —showing approximately when the canoe was made. A broken pot found underneath the canoe was carefully preserved, and samples were collected of the potsherds that litter the bottom in the surrounding area. Then, rubber rafts were slipped under the exposed hull, inflated from a scuba tank, and the hull sections were carefully slipped onto a floating cradle used to transport the canoe to the headquarters of nearby Pettigrew State Park where it is being preserved.

"Even with one end missing, the remaining portion of this canoe measured slightly over 31 feet long," said Lawrence. "This is the largest Indian dugout found in North Carolina, and is certainly one of the largest found in the Southeast. It's also in good condition, and features unusually fine craftsmanship. We won't know how old it is until radio-carbon dating is completed, but it's typical of the design used by coastal Algonkian Indians before white settlement. Its association with broken pottery may also indicate the presence of a village that is now submerged."

The Lake Phelps canoe is only one of many recent, exciting discoveries in North Carolina archaeology. The 400th anniversary celebration of North Carolina has focused attention on our past, and as part of the four-year celebration Governor James G. Martin has declared 1986 the "Year of the Native American" in North Carolina. In addition to commemorating the state's Indian heritage, the committee has also sponsored research projects that shed new light on how coastal Indians lived and used the abundant wildlife, fisheries and other natural resources of our state.

Archaeology has a relatively short history in North Carolina, dating back only to the 1930s when Dr. Joffre Coe established the archaeology program at the University of North Carolina. Early work centered largely on the Hardaway site, one of the most significant finds in North America. This site dates back at least 12,000 years when small bands of prehistoric hunters roamed the tundra which then covered North Carolina. These "paleo" hunters sought such extinct Ice Age mammals as mastodons and wooly mammoths. Other archaelogical projects have centered on the elaborate temples and mounds built by intruding tribes from the south at Town Creek in Montgomery County, and the complex mound sites and cultures of the Catawbas and Cherokees in the western Piedmont and mountains.

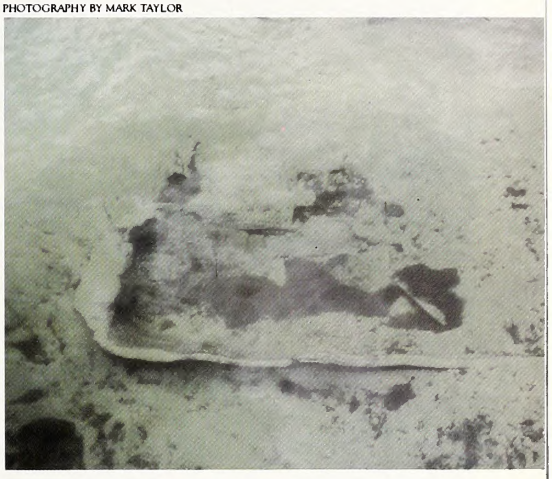
In recent years, however, attention has turned to the Siouan and Algonkian cultures of the Piedmont and Coastal Plains. These small, largely forgotten tribes had simpler cultures than their powerful neighbors, and left fewer obvious signs of their occupation. By the early 1700s, they had also been eliminated by European settlement. Some of the discoveries of their passing, such as the Lake Phelps canoe, are accidental. Others are the result of deliberate searches by archaeologists, and a surprising number are by-products of state environmental permits required for coastal development and mining.

The Algonkians, extending from Newfoundland south along the coast to North Carolina, were a small series of tribes sharing a common family of languages. These tribes expanded into North Carolina from the North at some unknown time, and lived on the outer Coastal Plain along the sounds and coastal rivers. Although they grew crops of corn, squash, beans and sunflowers they depended heavily on coastal waters for fish, shellfish, waterfowl and game.

Most of the work on the coastal Algonkians has been done by archaeologists David Phelps and Paul Green at East Carolina University in Greenville. For the past few years, Phelps and Green have been working on a unique project funded by the America's 400th Anniversary Committee. Its goal is to locate the Indian villages visited by the Lost Colonists, who occupied

***A 31-foot** Algonkian canoe (right) will be saturated with a sugar and water solution, an effective method of preserving large wooden artifacts.*

PHOTOGRAPHY BY MARK TAYLOR



***The bow and stern*** *of the canoe detail its construction. The outside of the hull was shaped with stone tools.*

***Underwater archaeologist*** *Leslie Bright unearths the canoe with a small dredge. Wood, plant remains, and pottery fragments help date the site.*

***A floating cradle,*** *buoyed by air mattresses and spare life jackets, supports the canoe for the long tow back to the headquarters of Pettigrew State Park.*

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Roanoke Island from 1584 to 1587 before mysteriously disappearing. Fortunately, the party included artist John White, who painted an excellent series of watercolors depicting Algonkian Indians and their villages.

"We began in 1983 by looking for the village of Chowanoke on the Chowan River in Hertford County," said Green. "This was not difficult to find because colonist Ralph Lane left a good account of his visit there in 1586, noting that it was a very large village that lay near Wiccacon Creek. When we began excavating the site, however, we found that it had been occupied by Indians from

***Dark soil stains*** *(left) reveal a dwelling exposed by an archaeological excavation of a Siouian village in Orange County.*

OFFICE OF COASTAL MANAGEMENT

***A shell midden*** *(above) left by Algonkians covers almost all of Permuda Island in Onslow County.*

***Water-screening*** *(right) removes plant and animal remains, pottery sherds, and fragments of stone tools from all of the soil removed in an archaeological excavation at the Occaneechi site in Orange County. Remains from the refuse pits provides information on the tribe's diet and subsistance.*

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about 800 B.C. until colonial times."

The process of conducting a full-scale dig is complex and time consuming. Test pits are carefully dug, and all of the fill is screened for pottery sherds, stone tools and fragments, and other debris. Actual signs of occupation are indicated by soil features. As the posts that were part of dwellings or palisaded walls rotted, they left dark, circular stains in the soil called post moulds. A circular or rectangular pattern of post moulds can clearly mark a wigwam or longhouse. Blackened soil and ash may also mark a family hearth. Refuse pits are eagerly sought because household garbage tells a rich story. The style of the broken pottery found in the pit indicates which Indians occupied the village, and at what time period.

Even more important are the charred bits of bone and plant remains burnt in cooking. Analysis of these fragments yields a profile of the tribe's diet, and indicates how heavily they relied on agriculture. Remains of fish and shellfish also offer clues as to whether a settlement was seasonal or permanent. An analysis of the growth rings in oyster shells, for example, shows what time of year the shellfish were harvested. The style of human burials, and the presence or lack of European artifacts in a grave, also help date a site.

"All told, we collected over 60,000 potsherds, 14,000 lithic or stone artifacts, and 11,000 pieces of bone from the Chowanoke site," said Green. "All this material needs to be analysed. It's such a rich site that we've just scratched the surface."

Researchers at ECU may have also found Pomeiooc, a palisaded village depicted in watercolors and maps by White. According to White's map, the village lay between Pamlico Sound and Lake Mattamuskeet near a small creek.

"Last spring we searched fields along a sandy ridge in that area, and eventually we found the style of Algonkian pottery that dated to White's time," said Green. "We began a dig, and found traces of a ditch that may be associated with a palisaded wall. We also found post moulds from longhouses that match those in White's painting. Refuse from the cooking and trash pits show that this is an Indian village of the 1500s and 1600s. We can't say for certain that this is Pomeiooc, but so far it's the best and only candidate."

"All of our research has also verified the accuracy of John White's paintings," added Green. "The post mould patterns at these sites match the longhouses and other features depicted in his drawings. The canoes depicted in his paintings also match those being recovered from North Carolina waters. By comparing his paintings with data from our digs, we have a better idea of how these Indians lived. White was an excellent observer, and we owe him a lot."

The most significant archaeological site on the North Carolina coast came to light not from a deliberate search, but as the result of a CAMA (Coastal Area Management Act) permit filed in 1982 for a condominium development on Permuda Island in Onslow County. The island is small, roughly a mile long and only a tenth to a quarter-mile wide, and lies in Stump Sound between West Onslow Beach and the mainland. The proposed development called for 383 condominium units and an associated marina to be built along the island's shore with tennis courts, swimming pools, and other recreational facilities located in the interior. Commercial fishermen were concerned because of potential pollution of the adjacent shellfishing waters, and archaeological surveys disclosed a very important site.

Ultimately, the N.C. Coastal Resources Commission designated the island an "area of environmental concern" because of its archaeological resources. The island was also placed on the National Register for Historic Places. The project was scaled down, and measures were included in the CAMA permit to protect and study the island's prehistory. To date, no development has taken place.

"What we found on Permuda Island was an extensive shell midden, or discarded pile of shells from oysters, clams, scallops and other shellfish eaten by Indians, that covered the entire island," said Billy Oliver, a staff archaeologist with the Archaeology Branch. "Preserved within this shell midden are pottery and other artifacts that show this island had been intensively occupied by Indians from about 300 B.C. until colonial times. Excavations disclosed remains of longhouses, human burials, refuse pits, and other signs of occupation. Among the discoveries was a cache of conch shells. This is particularly interesting because these shells were sometimes traded to inland tribes, who used them ceremonially to hold a purgative called the black drink. These shells are found as far inland as Kentucky. The sites on Permuda Island have also been almost perfectly preserved. Shell middens are high in calcium, which neutralizes soil acidity that tends to destroy many artifacts."

Tom Loftfield, an archaeologist at the University of North Carolina at Wilmington, conducted many of the surveys on Permuda Island. "These were the same Algonkian Indians that were found along the rest of the coast," he said. "The remains at Permuda Island can tell us a lot about how these Indians lived. The Algonkians utilized the sounds and estuaries much more than the Outer Banks and the open sea, and were heavily oriented towards the water. Although they grew some crops, refuse from trash pits show that the Algonkians who lived right on salt water didn't rely on agriculture anywhere near as much as Indians even a little ways inland."

Significant discoveries have also been made in the Piedmont. The small Siouan tribes which occupied the Piedmont share linguistic roots with the western Sioux. These tribes did not migrate into North Carolina from the West, but probably originated from a common people in the distant past. Like the coastal Algonkians, Siouan customs, religion and roots lay with related tribes to the North and not with the "Mississipiean" mound builders who invaded North Carolina from the deep South.

The best record of the Siouan tribes is

## Volunteer to Dig

Many people are fascinated by archaeology, although the number of men and women employed in this field is limited. The opportunities to get involved in archaeology, however, are not limited. Volunteers are needed to help at digs, catalogue artifacts, and participate in all of the work performed by professional archaeologists.

"A dedicated amateur archaeologist can make a real contribution," said Steve Claggett, chief archaeologist for the Archaeology Branch of the N.C. Division of Archives and History. "We need a lot of help, and many volunteers are amateurs only in the sense that they don't receive a salary. Some amateurs even plan their vacations around digs, and travel all over the country."

If you're interested in learning more about archaeology in North Carolina, or becoming actively involved, opportunities are available through an organization called the Friends of North Carolina Archaeology. More information on this organization is available from the Archaeology Branch, N.C. Division of Archives and History, 109 E. Jones St., Raleigh, N.C. 27611.

found in the writings of John Lawson, who traveled extensively through North and South Carolina in the early 1700s and recorded his observations of Indians and natural history in his classic book, *A New Voyage to Carolina*. One of the sites visited by Lawson is the village of Occaneechi, located on the Eno River near the Great Trading Path which led from Virginia through the Carolinas. The Occaneechi were important traders, and acted as middlemen between the various tribes and between the whites and Indians. In fact, Lawson described them as the most prosperous Indians he encountered.

MARK TAYLOR

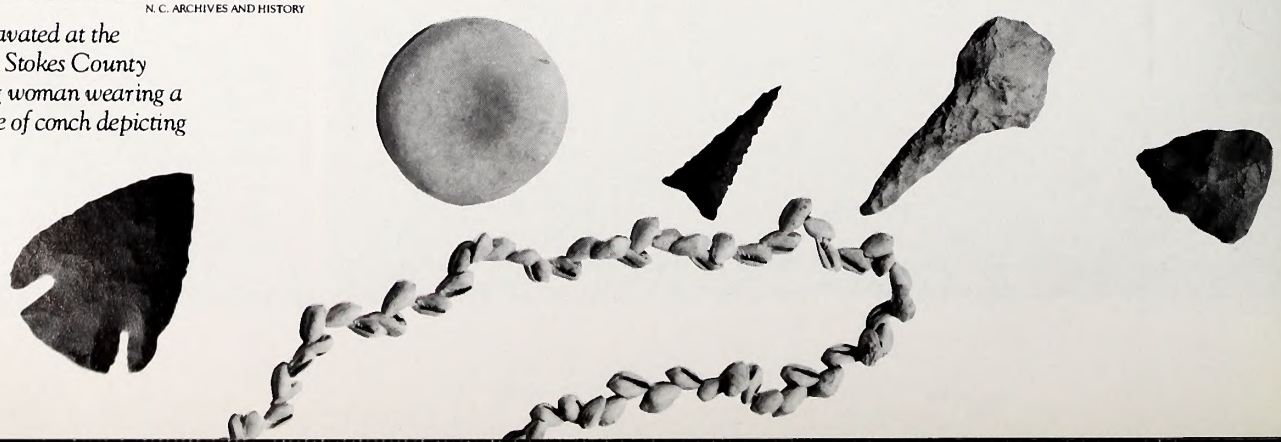
***A reconstructed** priest's house (left) lies within the palisaded temple site at the Town Creek Indian Mound Historic Site in Montgomery County.*

N. C. ARCHIVES AND HISTORY

***This grave** excavated at the Saurtown site in Stokes County revealed a young woman wearing a shell gorget made of conch depicting a rattlesnake.*

N. C. ARCHIVES AND HISTORY

***Shoreline erosion** in Currituck County recently disclosed this ossuary, a mass grave used by the Algonkians. Bodies were first stored in a mortuary house. Later, the remains were wrapped in bundles and interred by a priest. Algonkian mortuary houses are depicted in several paintings by John White, one of the founders of the Lost Colony on Roanoke Island.*



Recently, archaeologists R.P. Stephen Davis and Trawick Ward of the University of North Carolina—working under the direction of Dr. Roy Dickens—believe they have discovered Lawson's village of Occanneechi.

"Work at the Occaneechi site in Orange County began in 1938 when Dr. Joffre Coe excavated a village at the Wall site," said Ward. "We went back to this site, and felt that it was a little too old to be the village visited by Lawson. Most of the artifacts were from the mid-1500s."

The researchers discovered some promising artifacts in a garden plot about 350 feet away from the first site, and dug several test pits. "We found evidence of a newer village, and began a full-scale excavation," said Ward. "We've now unearthed about 60 percent of the village, and have found post moulds of nine structures, a palisaded wall, refuse pits, and human burials. European artifacts found in the graves include scissors, spoons, rum bottles, case knives, beads and other implements dating to Lawson's time."

Ward feels that the importance of this discovery lies not in discovering Lawson's village, but in the opportunity to examine how European contact affected the Indian's culture.

"There are some striking differences between the two sites, especially in burial practices," he said. "In precontact time, the dead were interred in burial chambers adjacent to or even within dwellings. At the later site, the burials are located outside of the village's palisaded wall. This change may reflect European influence."

Ward cautiously adds that there are other differences in the burials. "At the later site, one individual appears to have been scalped and another has a musket ball in the lower leg. Analysis of the bones also shows that there's a greater incidence of stress and disease at the later site. Infant mortality is high at both sites, as expected, and burials of elderly are rare. In precontact times, an Indian who lived past 40 was considered old. At the newer site, however, there's a much higher proportion of young adult males in the burials. This probably reflects stress associated with the encroachment of Europeans."

Similarities were also noted in both sites. Examination of the refuse pits show that both villages relied on agriculture, and corn was the most important crop. This was supplemented by game and fish. Deer was the mainstay, and a surprising number of catfish remains were found at both sites.

"When the Europeans reached North Carolina, most Indian tribes were agricultural societies that supplemented their diets with hunting and gathering," said Ward. "The shift to agriculture took place at the beginning of the late woodland period (800-1650 AD). This coincides with the development of palisaded villages, which were necessary for protection as settlements became more permanent."

What is Ward's overall impression of the sites? "We see a culture that is under increasing pressure from disease, warfare, and other stresses resulting from the invading Europeans," he said. "Yet, although the Indians quickly adopted some of the Europeans tools the patterns emerging from their burials, dwellings, and refuse pits show that they resisted change and maintained most of their tribal structure and customs. By 1730, the surviving members of the Siouan tribes which had once occupied the Piedmont had moved north to New York to join the Iroquois confederation, to whom they were distantly related. The Tuscarora, who occupied the inner Coastal Plain between the Algonkians and the Siouan groups, did the same thing in the early 1700s after the Tuscarora war."

No one knows how many Indian sites there are in North Carolina, but the number is staggering. One reason is that Indians occupied North Carolina for at least 12,000 years. Another is that their "slash and burn" style of agriculture was similar to what is now practiced in central and south America, and soil fertility was probably exhausted within a generation requiring that fields, and often whole villages, be moved regularly.

"Anywhere you have high ground near water in the Coastal Plain and Piedmont, you'll find evidence of Indian occupation," said Steve Claggett, chief archaeologist for the Division of Archives and History. "This has become especially apparent through our review of CAMA and state mining permits. Not all of these sites disclose a Permuda Island, of course, and often a surface collection of artifacts is all that's needed. However, we've accumulated a mass of data from thousands of sites showing which areas were occupied by particular groups or tribes in certain time periods."

The archaeological review of mining permits began about three years ago when officials learned that mining operations had destroyed unmarked Indian burials in Camden County. "We now route our mining permits through the Archaeology Branch to prevent this," said Jim Simons, a mining specialist with the N.C. Division of Land Quality, which regulates mining in the state. "Archaeologists can review a permit and have a good idea if there was an Indian occupation at a site. We don't stop work at the mine, but ask the mine operators to avoid sensitive areas. They're usually very cooperative. It's no accident that we find substantial evidence of Indian occupations at gravel mines. The best sand and gravel deposits are found on well-drained ridges near waterways. These areas also offered the best campsites for Indians."

Claggett says that the review of CAMA and mining permits in the Coastal Plain and Piedmont gives archaeologists a tool that is missing in the Mountains. "There are no comparable land-use permits that give us an opportunity to study sites in the mountains before they're destroyed by developments on the ridgetops and river valleys. I'm sure that lots of small, prehistoric sites occupied by the ancestors of the Cherokee disappear all the time."

Why save or study these sites? "Archaeological remains are a resource—just like a forest or a marsh," said Oliver. "These sites can tell us about the plants and animals present at a certain time, what the climate was like, and how the Indians used and adapted to their environment. Losing an archaeological site to a shopping mall or road without the opportunity to study it is like tearing a page out of your only history book. All this information is just waiting out there to be read, and anyone with a strong interest can help us preserve and understand our past."

Much of the current interest in archaeology, however, simply lies in our fascination with the past. Inevitably, the switch from relic hunting to archaeology deepens that appreciation, and brings with it the humble realization that we are not the first, and will probably not be the last, people to inhabit this state.

"I used to collect arrowheads until I became involved with archaeology," confided Jim Simons. "Then, I became more interested in understanding how these people lived than in collecting a boxful of pottery and points. One day last fall while I was fishing at a lake, for example, I came upon an eroded tool-making site on the shore. In its center was a core stone from which blanks were chipped for tools and projectile points. Beside the core stone was a partially finished point lying next to a pile of chips. All that was missing was an Indian working the stone with a deer antler, and nothing had been touched for thousands of years. I felt just as though I had walked into someone's home workshop. I picked up the point, marveled at its craftsmanship, and wondered what the man who made it was like. Then, I put everything back in place and left." ⊠

# 'Possum Times

When opossums decided to move into our home, there were bound to be problems. But it could have been much worse.

by Carolyn Sellers Ashkar/photography by Jack Dermid

When I first came to North Carolina, I was delighted to find that the red berries of the dogwood trees attracted squirrels. I could watch them while they ate, and hear them as they played on the roof. I soon moved farther out in the country where spring was announced not only with bird song and tree bud, but by my cats bringing in live little animals and letting them go inside the house. I had to learn quickly how to catch these little fellows, although a chipmunk proved to be a supreme challenge.

Alas, these preliminary experiences didn't prepare me for dealing with another visitor—the opossum. Demonstrating the adaptability of the species, these nosy marsupials showed no qualms about entering our house to forage and they found food, even though what they discovered was hardly typical of their native diet.

Most opossums travel continuously, but some range within a relatively small area their entire lives. Spaces under buildings are popular as stopovers or as permanent homes. Of prime importance to opossums is a place with a stream and a woods. Our property has a 'possum-pleasin' setting, and we have the perfect accommodations—our basement, easily accessible to small animals, and kept warm and dry by uninsulated furnace ducts. These features undoubtedly enhanced the possibility of my meeting this strange creature.

While adding some rooms to our house, we put in what we figured would be a cat door. One morning, at three o'clock, a 'possum strolled through it. The kitchen—in the midst of being remodeled—had only the counter and no cabinets, just a board with all the pots and pans and some foodstuffs on it. The cats stayed clear of him (or her, since opossums look alike except for the pouch) as he strolled among the pans, eating potato chips and vegetable shortening, having neatly pried off the plastic lid from the can.

On another occasion, he took a package of peanut butter crackers from my purse and ate them on the spot! Too, that 'possum stole a pair of sunglasses in a flowered case and a bottle of cold tablets. When the bottle was found, it had a neat longwise strip of the plastic broken out and some of the pills, which taste like alum, were missing. After removing these last two items from my purse in the living room, he secreted them in an adjoining room that was being used as a workshop. Two months after the theft, my husband found the glasses, the case, and the pills behind a board in a little nest of leaves and sawdust. The marks of the opossum's teeth are etched in the frame of the sunglasses.

After three opossum raids, and various midnight gifts brought in by the cats, we started blocking the cat door at night, but not before I had had two memorable encounters with this maurader. He always gave himself away, for sometime during each visit, as he meandered over the shelf, he would knock down some of the pans, setting off a clattering alarm.

One apparent opossum trait is stubbornness. It is not easy to extract an opossum from one's home when he does not wish to leave. I tried poking him with a stick and even spanked him with it, only to be rebuked by a mean hiss showing a fine set of needle-like, white teeth, 50 in all. I rather wanted him to "play 'possum" or "sull" as it is sometimes called, but I guess I did not frighten him enough, if at all. Pushing him to the front door was a long process for he would only travel around the edge of the room. His lovely, fluffy fur coat probably protected him well. I would like to have touched it, but I was easily deterred by those teeth.

I had begun to call this first opossum Opie, but in the spring I started to wonder if he had not been Ophelia instead. One warm day, to my amazement, a baby opossum came up through the narrow slit in the floor where the connection between the kitchen addition and the existing house was not yet finished. The little 'opossum popped up, almost as if from a toaster. Its feet were pink and its fur was sparse, fluffy, and white with a transparent quality about it.

***The quarters** may look cramped, but that's the way nature meant for baby 'possums to travel, until they are old enough to fend for themselves.*

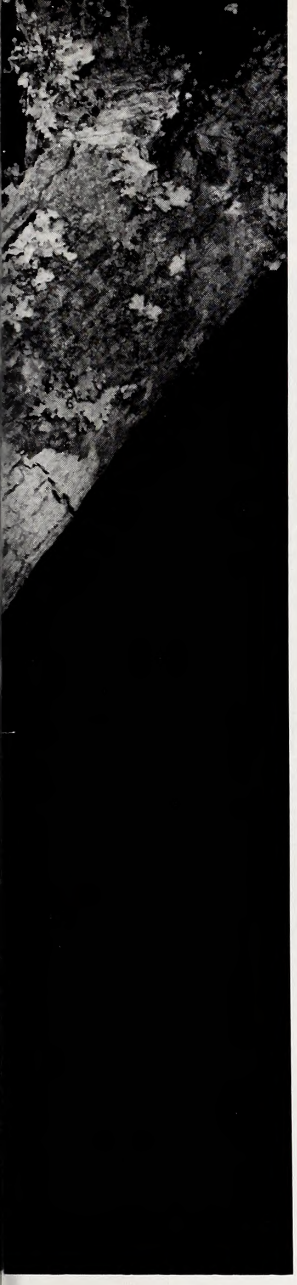
This opossum was about the size of a four-week old kitten, but its climbing ability was already more advanced than its walking skill. Cute as it was, I did not want it in the house, so I donned my animal-catching gloves, trapped and hand-delivered him to the field across the road. No sooner had I returned, than another one popped up. I lost track of how many I put out, but one scaled a rug-covered staircase and hid for several days in a closet.

Although the cats confronted adult 'possums, they were positively no help in finding the babies. When the opossum kits started arriving, the felines sniffed at them for a minute, and then left them alone. I wondered if any that I put out came back through the hole a second time, because the latter two or three seemed more wily than the first few. The hole was promptly filled that evening.

Later, the termite man came to our house and was spraying the basement, which is actually more like a cellar. He put the solution into a crack in a wall that served as a divider. Suddenly, a large bulk about two feet long came out from behind the wall, its face wet with the bug spray. Calmly, the huge opossum went down to the stream to wash. Since confrontations between cats and the adult 'possum continued that winter, as in years past, he must have been unaffected.

According to experts, the opossum eats carrion, insects, young animals, wild grapes, dewberries, and persimmons—its favorite food. I personally have found that potato chips and peanut butter crackers, as well as cat food, are quite suitable to serve opossum guests. In the late evening, I have seen them eating heartily of the dry cat food I put out for the birds. They then waddle contentedly back to the woods, their light gray fur glistening with silver in the pale light.

These introductory episodes occurred several years ago and that 'possum family moved on, perhaps to a place with more persimmon trees. This year, however, opossums have again rambled into my life. Commonly, now I lay out a smorgasbord for two gourmet cats . In the late summer this year, three baby opossums, "wind-up" fur balls with



**Mother 'possums** *become transports for babies after they leave her pouch. 'Possum young are mistakenly thought to hang from mom's tail, but their prehensile tails do enable them to hang from a branch. After a month of being cared for, the babies are weaned and they are on their own.*

***After birth,*** *embryonic possums crawl to mother's pouch where they attach themselves to a minute nipple. They will remain in the pouch for two months. The opossum is North America's only marsupial.*

gleaming teeth, conducted continuing raids on those parts of the feast that the felines did not find worthy.

The babies found their way into the house through a hole under the sink. I could have had their entrance blocked, but I was eager to see how they would behave. Overall, they were well-mannered, except for a few minor instances. One night I heard paper rattling very near the bed. It did not sound quite like the scratching of the kitten which sometimes plays in the wastebasket. I turned on the light and found a baby 'possum explorer trying to claw his way to the top of the plastic basket. The opossum kit hissed at me, and not having my animal-catching gloves handly, I picked up the basket, tilted it so he would have to stay at the bottom, and took him outside.

Whenever there was not enough food left out, the opossums tended to stray into other parts of the house. And, against their wills, they sometimes ended up in the bathroom, having been chased there by the kitten.

Unlike my earlier encounters, this new batch of little ones did not just drop by—they stayed for dinner.

At first it was hard to tell, but it soon became obvious that the same three opossums were coming in all the time. (A litter can be up to 14.) As they grew, their facial markings became clearer and each opossum was then more distinguishable. Their behavior was somewhat individual, too. When they first started coming in, they were quite small, especially the littlest one which could easily fit into the palm of one's hand. The next was a good bit bigger, and the largest was about the size of a two-month old kitten. The biggest was more aggressive in his search for food, and more likely to stand his ground when confronted by the cats or when he felt threatened by me. The smaller two seldom came in without their "big brother," but the largest one was often there alone. Caught by surprise, he assumed a defensive posture, shoulders hunched, neck pulled down into them, chin up, tapered teeth fully displayed. His supposed-to-be-threatening growl was barely loud enough to hear, and the pitch was so high that the effort was a pathetic, laughable imitation of the wonderfully vicious growl of the grown opossum. While this young one's response was brave and correct, he simply could not manage to be fearsome.

Just backing away from me soon became his usual defense; however, he would sometimes leave completely, go back under the sink and wait, or sneak behind the refrigerator, if I entered the room unexpectedly or moved around in the kitchen too much. After about a month, I could go about my business to within a foot and a half of them. As long as I did not make any sharp moves in their direction, they took little notice. If the cats had not left much, I put out a little more dry food. After about six weeks, when I decided to treat them to some raisins, their departure and return was not much more than a slow turnaround.

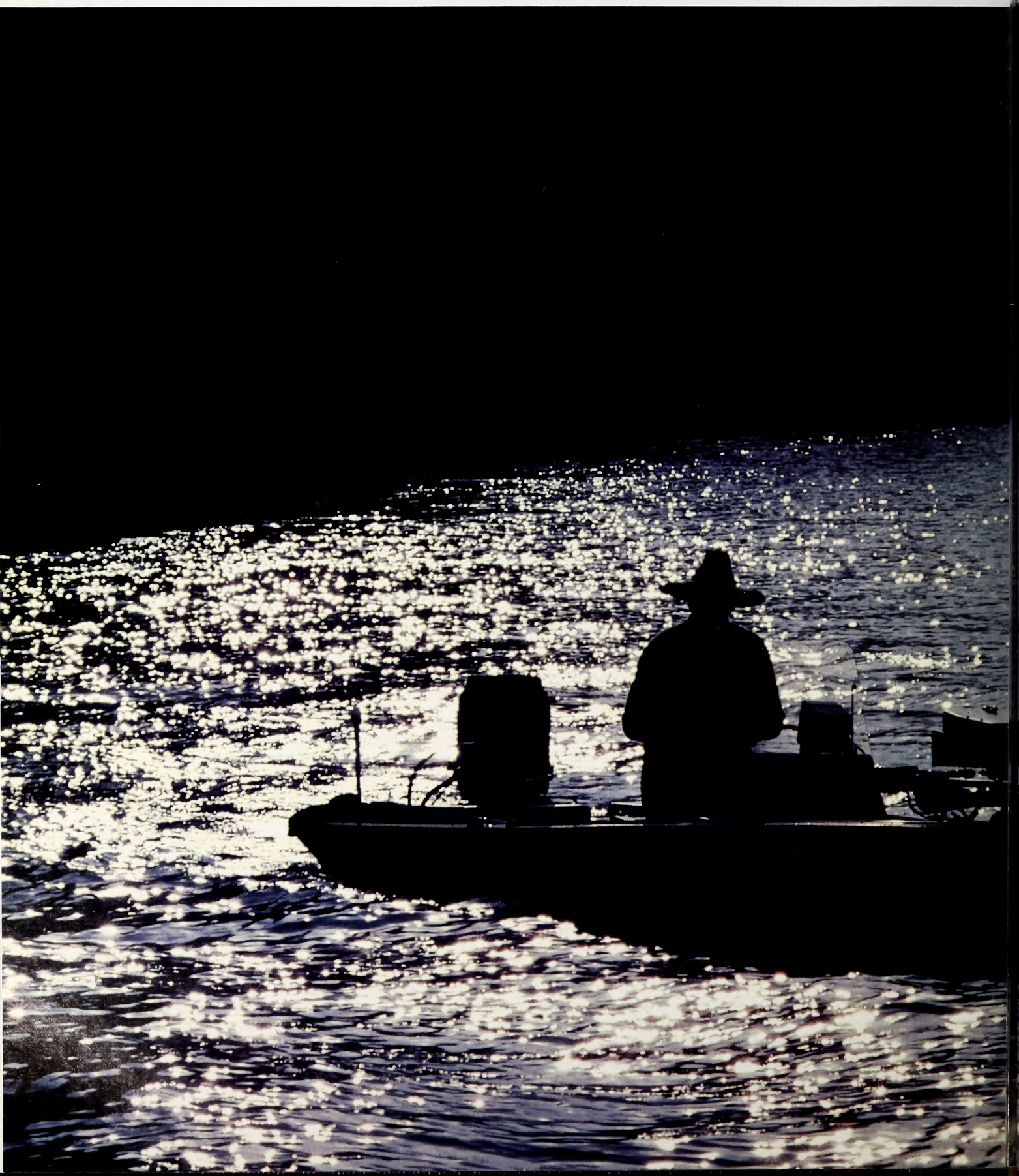
One of their favorite snacks was milk. Their eating habits were perhaps neater than those of the cats, if one discounts their continually stepping on the lip of the dry food tray and spilling the contents, and the fact that they would not eat the many crumbs they dropped. They were also very casual about passing their tails through the drinking water or dropping crumbs into it. Their claws, well-shaped and highly functional, would grasp the side of a bowl to tip it in order to drink the last of the milk or to reach a little bit of food. Like squirrels, they would sit on their haunches, using their dexterous paws to hold a raisin or a piece of dry cat food. Perhaps because of the length of their teeth, they chewed with their mouths open making a crunching sound.

The opossums grew, but the hole did not nor the space between the cabinet and the base, and the kits began having to struggle to pass through the slot to enter the kitchen. One day the lead opossum did not arrive for his usual foray. No doubt frustrated, he could no longer squeeze through the opening. However, that same evening, this adaptable little fellow was on the front porch lined up with cats, eating food put out for some strays. He even played for a while with two kittens.

The babies usually came in an hour or so after dark, and often, for a second time, around 11 or 12. On gray days, they entered as early as noon. Late one warm, overcast afternoon, the smallest opossum came in and stopped by the dry food. He wanted to eat, but he was so sleepy that he would quit chewing after every few bites and yawn.

My opportunities to observe them were over when the last one went through the "rite of non-passage," and I have missed the visits of those diligent little raiders. Still, I know they got off to a nutritious start. My chance encounters and the "open kitchen experiment" make me feel fortunate at having met these elusive creatures, and I have learned something of their unusual ways. I look forward to further adventures with opossums. ⊠

# Fish Deep During



# Dog Days

Anglers fishing our mountain lakes have learned a few tricks that catch fish even during the heat of late summer.

by Jay Davies

Whoops, I got one or I think I do," I yelled as my rod snapped into a tight bend. Gary Wright of Sylva, my fishing buddy, swung the motor over and cut the throttle.

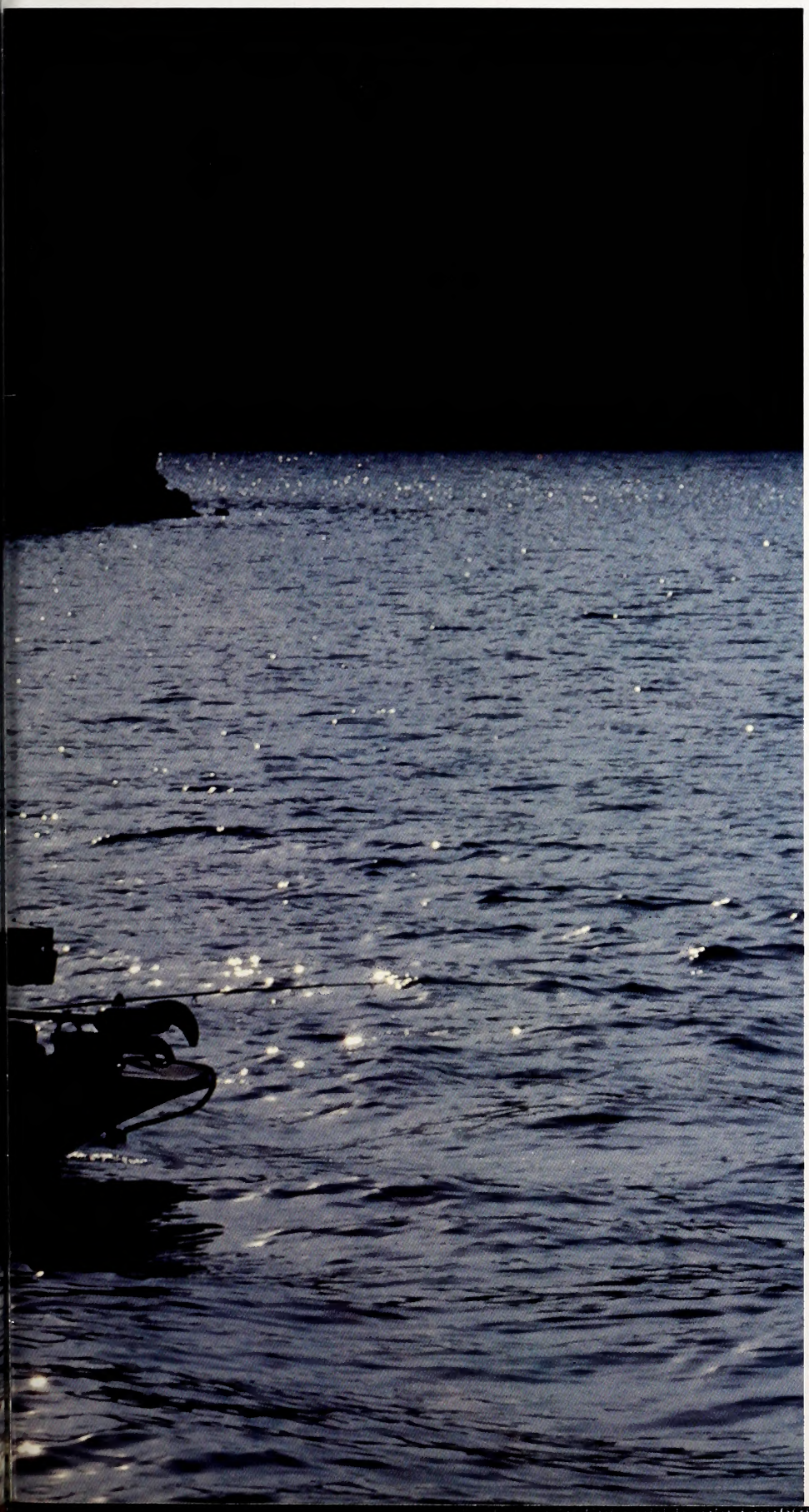
"Is it a fish?" he asked as he started to reel in his line.

I could feel the pressure on my rod gradually diminish as the boat slowed. "I don't know," I said, but I kept on reeling. Suddenly, I felt a series of taps. "It's a fish," I said, and a minute later I lifted a dripping, 18-inch walleye from the water and added it to several others already in the cooler. It hadn't been a spectacular fight, but then that wasn't why I was grinning. "Just the right size for filleting," I said as Gary cranked up the outboard.

I yawned, poured myself a cup of coffee and checked my watch. It was 2:30 in the morning and we'd been fishing since a little before sunset when the orange globe dipped below the horizon, bathing the lake and us in that special golden light of late summer twilight. I shifted my weight in the chair, stood up and tried to plump up the seat cushion, then sat back down. Gary circled back to where I had hooked the fish and we put out our lines. My line was on the inside, next to the bank, so I let the reel spin out three colors on the No-Bo line and clicked the reel into gear. When the line went taut, the rod started thumping as the lure skipped across the bottom.

"You don't want it to hit the bottom all the time," said Gary. "Just the high spots."

I reeled in a few feet and the rod settled down. I looked at the flashing orange light on the depth meter. It was registering 12 feet. I did some mental arithmetic, and figured my lure was probably bumping bottom at 10 feet. Gary was trolling on the outside, probably in 15 feet of water and he had to drop his lure back farther than mine to get it thumping. Between us we were



CURTIS WOOTEN

***During the hot,*** *dog days of late summer, mountain lake fishermen can improve their chances by trolling along rocky points through the night.*

covering a swath of lake bottom a little over 10 feet wide. If the fish had moved into our range, we'd know soon enough.

The little 8-horsepower Johnson was at half throttle and the boat was kicking up a small wake in the moonlight. It was hard for me to imagine a fish could swim that fast. "Don't you think we're going a little fast?" I asked.

Gary checked the bubbles as they sped past the hull. "Not quite," he said and cranked the throttle open a tad more. I felt the boat surge ahead and my rod tip started to hum.

"A lot of lures can't take this kind of speed," said Gary. "They don't run true. If a lure cuts from side to side or pops to the surface, and can't be adjusted, I throw it away."

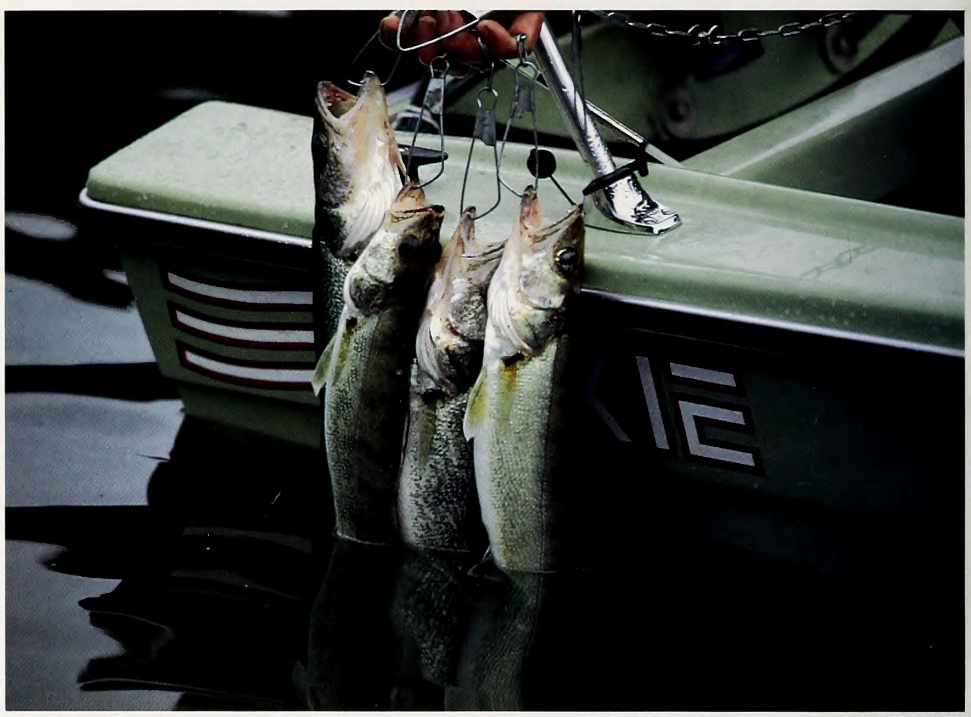
Gary and I were fishing Hiwassee Reservoir in Cherokee County in the far southwestern corner of North Carolina, and it was September. Some people say August is the month for "dog days," but from my experience I find little difference between August or September. The weather is uniformly hot and humid. It's the time of year when most anglers retreat to the shade of a large oak, sip ice-filled tumblers of lemonade, and try to dream up excuses for not mowing the lawn. For sportsmen like Gary Wright and a few others, however, the dog days are one of the best times to go fishing.

Gary owns a sporting goods store in Sylva and he is often asked, "What's the best time to fish?" He usually smiles and answers out of the corner of his mouth, "Anytime you can go." Sometimes he even gets a laugh. "Seriously though," he adds, "we've got fish in these mountain reservoirs, but the problem is people don't know how to fish for them."

Gary attributes much of what he has learned about fishing to either his fishing buddy, Mike Bryson of Sylva, or from books written by Buck Perry. According to Gary, fish retreat into the depths to escape the bright light of late summer days, often going down 40 feet or more. Unless an angler has sophisticated deep-trolling gear or jigs, these fish are out of his reach. At night, however, the fish leave their deep water refuges and move into the shallows to feed. Exactly when this "movement" occurs is anyone's guess, but it usually happens once or twice in every 24-hour period.

"You wouldn't believe it," said Gary when I asked him what it was like to fish when the fish are in the shallows at night. "Why I've fished for 8 or 10 hours with hardly a fish, then catch a limit inside of 15 minutes once the fish moved in."

A lot of anglers fish at night during the summer, but Gary adds a twist—he trolls.



CURTIS WOOTEN

***Walleyes are** perhaps the prime target for fishermen who troll at night, and these fish move into shallower water 10- to 15-feet deep at such times.*

Some fishermen have a negative image of trolling, and I think I know how that happens. When I was 12, I used to get up before light to row across the lake we lived on, to a section of shoreline that had a thick weed bed. I rowed because I didn't have a motor and it was a heavy, old wooden boat with inch-thick planks, but I didn't mind because it was all mine. Flatfish were popular then and I trolled a green and yellow frog pattern on one rod and a black and silver one on the other. They weren't particularly "hot" lures, simply the only ones I had. I'd troll along the weed bed until the sun was high overhead and if I was lucky, maybe every third trip, I'd hook a northern pike. Fisherman's luck, right? Well, when you're 12, catching anything is exciting, even if it happens only occasionally. As we get older though, we place more emphasis on skill, and how much skill is involved in dragging a lure behind a boat?

Actually, the kind of trolling I did as a kid relied on luck to a considerable degree, but the kind of fishing Gary and I did that night on Hiwassee was a world away from those boyhood experiences. For starters, we were very particular about which shorelines we trolled.

"The best locations," said Gary, "are along points which drop off rapidly into deep water." These areas are productive because when the fish move inshore to feed, they follow submarine landmarks such as ridges, drop-offs, and points which lead from the deep water into the shallows. We avoided flat bottomed coves that lacked structure such as points or drop-offs because those areas don't attract many fish.

Locating good areas is critical, and an angler must become adept at translating the visible topography along a shoreline into an underwater map. On some lakes, anglers may be fortunate enough to have access to topographic maps which show the contours of the lake bottom, but for most reservoirs in western North Carolina these maps are lacking. Needless to say, a good depth finder is essential.

On any night, the fish may move all the way into the shore and be in a foot of water, or they may stop at 10- or 20- foot depths, or anywhere in between. The key to catching them, said Gary, is to be able to place your lure at the depth they are feeding and to run it at the speed that will make them hit. "The color and style of a lure makes little difference in my opinion," he said. "Still, I use light-colored lures in clear water and darker ones in dingy water."

Many fishermen may troll too slowly. Gary uses an 8-horsepower outboard, and says the slowest he trolls is with the throttle open about a third. Even at that speed, he believes his lures are traveling nearly twice as fast as you would reel one with the fastest quick-retrieve available. "It's surprising how fast a fish can swim to take a lure," he said. "One time I caught a limit of walleye while trolling with the motor wide open."

The depth a lure swims is just as important as its speed. Lures are designed to

CURTIS WOOTEN

***Trolling is also** effective in mountain lakes during the day, but fish are likely to be much deeper.*

run at particular depths. Most deep-diving plugs have large lips, while lures with small lips are either mid-water runners or shallow-running lures. Gary has his tackle box stocked with an assortment of surface-, shallow-, mid-water, and deep-running lures which he interchanges frequently while fishing to achieve the desired depth.

You can also control lure depth by changing the distance the lure is trolled behind the boat. As you let out more line, a lure will tend to dig deeper, while reeling the lure closer to the boat makes it rise. Fine-tuning the depth of a lure is also possible by varying the trolling speed. Finding the right depth and line speed is a matter of experimenting with different combinations.

Most of the trolling we did that night on Hiwassee was with lures running between 5 and 15 feet deep. When trolling lures down to 15 feet, a non-stretch line such as No-Bo line is helpful. Regular monofilament has too much stretch when you are trolling 60 to 90 feet of line, and if a fish hits, you'll have trouble setting the hooks, and may not even know it was there. No-Bo, particularly, has almost no stretch at all, yet it retains all the other qualities of monofilament. When a fish hits a lure trolled on non-stretch line, you know it and you don't have to worry about setting the hooks—the fish does that for you. Another advantage to No-Bo is that it has color bands every 10 yards so it is easy to let out just the amount of line you want to control lure depth.

No-Bo, however, will only effectively take lures down to 15 or maybe 18 feet at most. To go deeper one must use wire line because only it has the weight necessary to drag the lures down into the depths and keep them there. But wire is tricky to use; it kinks easily and cannot be tied in standard knots. For these reasons, it's not recommended for novices. Regardless of what line you use, it need not be exceptionally strong, and 12- to 15- pound test is adequate for fishing in our mountain reservoirs.

Trolling rods tend to be short, between 4 and 6 feet, and they need not be expensive. Solid fiberglass rods will catch fish just as well as expensive graphite. The overriding characteristic a trolling rod must have however, is stiffness. If a rod is too limber, you won't be able to feel the lure bump the bottom or set the hook.

Also, reels need not be sophisticated, although they should have a good drag. There is little or no "give" in a trolling outfit, and unless the drag can slip line when a fish hits or the plug gets fouled, it will tear the lure from the fish's mouth or cause the line to break. According to Gary, the drag should be set just a little tighter than what is needed to keep the lure from pulling line off the reel when it is trolled.

Because a lure bumping along the bottom tends to hang up frequently, it's handy to have a plug knocker to free your lures. Most consist of a stout cord attached to roughly a quarter to half pound of lead into which several strands of small chain have been imbedded. To use one, simply slip it onto your fishing line using the special loop of wire and let it slide down to the lure. If all goes according to plan, the knocker will slam into the fouled plug and knock it loose, or the chains may entangle themselves with the hooks. By pulling on the cord attached to the knocker, you can usually pull the plug loose.

Another appealing aspect about trolling is that you don't need a $15,000 bass boat. A 12-foot boat and small outboard are all you need, and it may take less gasoline to run it all season than it would to fish out of a bass boat for one day.

If all this is beginning to sound like the kind of fishing you'd like to try, come to the hills and give it a try. Dog days are a great time to fish, and after all, you can't mow your lawn at 2:30 in the morning. ⊠

*Giardia Causes Intestinal Illness*

# Parasite May Infest Remote Waters

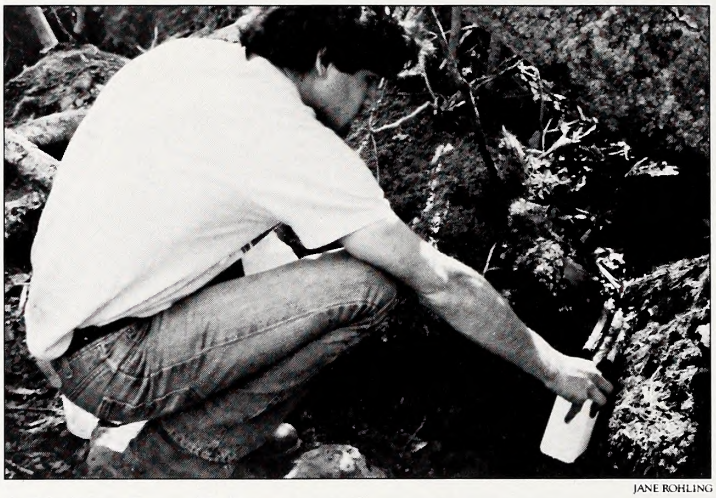
*Written and Edited by Mark Taylor*

One sufferer commented that he had exactly 10 seconds warning between his first discomfort and the onset of the symptoms. He wasn't in Mexico, but what he had certainly fit the descriptions of Montezuma's revenge. He was only one of many hikers to learn today's most valuable backcountry lesson — don't drink the water.

Giardia lamblia, a microscopic whale-shaped protozoan, is the cause of this new sickness that has led to so much concern over the purity of backcountry water supplies. This protozoan is so small that 16,000 can fit in a drop of water the size of a pinhead, and ingesting only 10 to 25 of the cysts may produce infection.

Infection occurs after drinking water contaminated by the feces of animals which carry the parasite. In the West the disease is often called "beaver fever," but giardia is also carried by deer, bear, horses, rabbits, dogs, man and many other wild and domestic animals. The symptoms include the sudden onset of diarrhea, painful abdominal cramps, and sometimes nausea. The disease is difficult to treat, and sufferers complain of relapses and exhaustion for months even after treatment.

The stools of an infected animal may carry more than 300 million cysts, and are most commonly contracted by drinking from a stream or other water source that has been contaminated. After the cysts are ingested, stomach acids break them down. The parasites then lodge in the small intestine and reproduce causing giardia's classic symptoms. An article in *National Wildlife* magazine last year noted that 16 million Americans are thought to be infected, and giardia has been found in every state.



JANE ROHLING

***Is Nothing Sacred?*** *Even pristine mountain streams may carry giardia, an organism which causes severe intestinal problems and may last months. The best treatment for backcountry water is to boil it.*

How can hikers and sportsmen avoid this parasite? The simplest solution is to carry water from home.

If this is not possible, however, there are two preferred alternatives for treatment. Boiling water is the best protection because giardia cysts cannot survive prolonged temperatures above 150°F. This will also kill other harmful bacteria and viruses.

If boiling water is not feasible, iodine can be used effectively. Dr. Peter Goth, a founder of the Wilderness Medical Association, states that "five drops of 2 percent tincture of iodine per quart of clear water will kill the parasites. In addition, 'Potable Aqua' tablets may be used. One of these tablets is the equivalent to five drops of iodine. In cloudy or extremely cold water, 10 drops of iodine or two tablets of Potable Aqua tablets should be used per quart."

After water has been treated, wait at least 30 minutes before drinking. If the water is very cloudy or cold, wait one hour before drinking. If you wish to flavor the water to cover the iodine taste, do so only after iodine has been added to the water.

Chlorine pills are not recommended to treat water. Chlorine quickly loses its strength on exposure to air, and it is difficult to ensure effective treatment.

There are also several filters on the market which claim to remove giardia parasites. Dr. Goth doesn't recommend these, however, because they don't remove other harmful viruses found in the water.

Experts note that there are two simple steps that everyone can take to prevent the spread of these parasites. First, leave your dog at home when you go into the backcountry. Dogs are extremely susceptible to giardia, and also are particularly apt to spread the disease. Second, use good manners yourself. Don't defecate in or near water sources. A good rule of thumb is to stay at least 100 feet from any water.

How common is the disease in North Carolina? "We've had no confirmed cases of giardia in the Great Smoky Mountains National Park," said Stuart Coleman, chief of resource management for the park. "However, we are on the alert and urge everyone in the park to carry in their own water or boil it. This is good advice for hikers anywhere."

Diagnosis of the ailment isn't always easy. The incubation period is between one and three weeks, although some authorities say it may be as little as five days. If giardia should strike while you're in the backcountry there's not much you can do except "tough it out" until you can reach medical attention, and be sure to drink plenty of fluids to avoid dehydration. Until recently, diagnosis of giardia was often overlooked because the symptoms resemble other diseases. Awareness is increasing, however. If you contract any of the symptoms after a camping trip, be sure and tell your doctor where you've been.

Perhaps the saddest result of the spread of giardia is that the days of safely drinking cold water from a clear mountain stream are over. On a recent camping trip on the Appalachian trail, I met three young men from Tennessee who laughingly told of an encounter with several New Yorkers who were putting funny little tablets into clear stream water before drinking. "Imagine, they said, "drinking city water all your life and then being afraid to drink our clean mountain water." Unfortunately, the New Yorkers had the right idea.

— *Kay Scott*

*Wildlife Could Thrive Beside The Fast Lane*

## Roadside Habitat To Be Improved

Quail, rabbits, and many other species of wildlife may find better living along the state's roadsides as the result of a new cooperative project being developed by the Wildlife Commission and the N.C. Department of Transportation. The project is designed to improve habitat for wildlife along state-maintained roads through wildlife plantings and adjustment of mowing schedules.

As part of the project, three pilot projects have been proposed by the Department of Transportation at sites along I-95 in the Coastal Plain, I-85 in the Piedmont, and I-40 in the Mountains.

"We will be evaluating different wildlife plantings at each of these locations to see what is most effective," said Bill Johnson, landscape engineer for the Department of Transportation. "We'll also reduce mowing in these areas to provide more food and cover. We want our roadsides to be more attractive for people and wildlife, and from these projects we'll be able to develop a program that could receive wider application in the future. An added benefit is that this program would ultimately reduce our maintenance costs."

JACK DERMID

***Highway Wildlife:*** *Rabbits, quail and other wildlife may benefit from a new cooperative project designed to improve wildlife habitat along the state's roadsides.*

Biologists feel this program has real potential to provide a lot of additional small-game habitat. "The openings found along our roadsides offer excellent habitat for quail and rabbits in addition to many songbirds," said Terry Sharpe, small-game project leader for the Wildlife Commission. "We can enhance this habitat through plantings and reductions in mowing. Most of the credit for the origination of this project goes to the Foothills Chapter of Quail Unlimited in Lenoir. This conservation organization came up with the idea and promoted it."

## Conservation Is Top Priority

Saltwater fishermen may be interested in joining the North Carolina Saltwater Fishing Federation. This new organization is dedicated to the conservation and improvement of saltwater fishing in the state.

"With increasing pressure on our saltwater species from a growing number of fishermen, and a potential reduction in stocks, we must take steps now to conserve our marine resources," said David Tompkins of Raleigh, president of the Federation. "The Federation's first priority will always be to take action to assure the future of recreational saltwater fishing in North Carolina."

Information on the organization is available from the N.C. Saltwater Fishing Federation, P.O. Drawer 40399, Raleigh, N.C. 27629.

*Carrying A Deer Foot Brought Bad Luck*

## Wildlife Officer "Tracks" Down Violator

When a Buncombe County man dumped the hide and legs of a deer a friend of his had poached, he never suspected he and his friend would be caught. No sir, not in a million years.

"It was really a very routine case," said Master Officer Danny Pierce, a wildlife enforcement officer stationed in Candler. According to Pierce, the case began when deputies with the Buncombe County Sheriff's Department noticed two men with some deer feet sticking out of their back pockets walking along a road. This was not a common practice and the deputies stopped and questioned the men. They said they had found the legs and hide of a deer in a trash dumpster a little ways up the road. That's when Officer Pierce was called in.

Pierce arrived on the scene and learned the two men had seen a man dump the deer remains into the dumpster. They also gave Pierce the man's name, description, and even his address. "After that," said Pierce, "the case just fell into place like the last few pieces of a puzzle."

Officer Pierce staked out the man's home. Later that day when the man returned and drove into his driveway, Pierce pulled his patrol car in behind and blocked the man's escape. "He was so surprised to see me standing there with the deer legs in my hand," said Pierce, "that all he could do was shake his head and say, 'I can't believe it. I just can't believe it.' "

Pierce read the man his Miranda Rights and everything got real serious. "He told me another man had actually killed the deer, and that the poacher had given him the hide and legs to dispose of." The man told Officer Pierce who the poacher was and where he lived.

When Officer Pierce arrived at the poacher's home, the man was standing in the doorway as if he had been expecting the wildlife officer. Pierce said the man wasn't surprised to see him because he figured the officer might show up.

The poacher offered to tell Officer Pierce everything if he agreed not to confiscate his truck and guns. Pierce said any deal was for the court to decide, but that he'd listen to what the man had to say. "He told me everything," said Pierce.

For his crime, the poacher was fined $100 and court costs of $37. Additionally, he was ordered to pay the Wildlife Commission $279 in replacement cost for the deer and had his big game hunting privileges revoked for one year.

"As I said," said Pierce, "it was really just a routine case. Now if you really want to hear about an interesting case, let me . . ."

But that's another story.

—*Jay Davies*

*Donated By Trout Unlimited*

## New Computer Helps Manage Trout

Mountain fisheries biologists with the Wildlife Commission have a new computer, thanks to several chapters of Trout Unlimited. The computer was donated to the Commission by TU, and will be a great help in improving fisheries management in the 34 counties of the mountain region.

The donation of a National Cash Register PC-6 computer, two floppy disk drives, and an Okidata printer was made by the following TU chapters—Dogwood Anglers Chapter in Statesville, Hiwassee River Chapter in Hayesville, Table Rock Chapter in Morganton, Stone Mountain Chapter in Elkin, Triangle Fly Fishers Chapter in Raleigh, Tuckaseigee Chapter in Sylva, and the Land-of-Sky Chapter in Asheville.

"This computer system will be a great help in storing and analyzing data, and even has the ability to produce enhanced color graphics," said Jim Borawa of Asheville, fisheries research coordinator for the Mountain region. "The computer will be used to prepare reports, store and analyze survey data on fish populations, and maintain records for fish hatcheries."

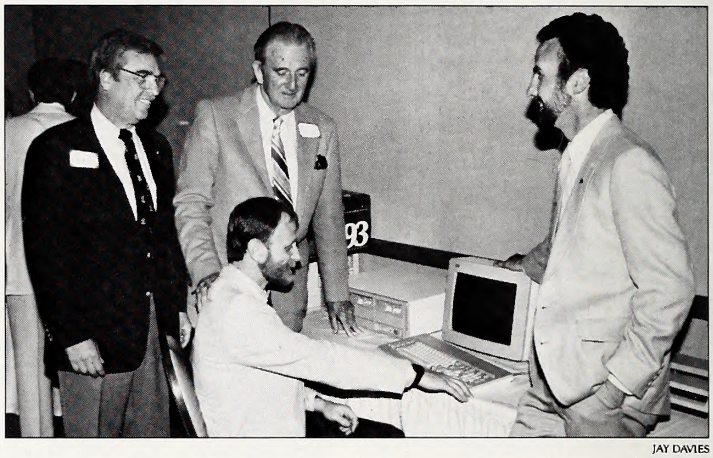
Trout Unlimited has a long history of supporting Wildlife Commission projects. Some of the other projects the organization has been involved in include purchasing and maintaining a horse for wildlife enforcement officers to use when patrolling remote trout streams, improving trout stream habitat, evaluating the effectiveness of planting trout eggs in streams, and aiding in stocking of fish.

"We've always enjoyed our relationship with the Wildlife Commission," said Robert "Chic" Webb, Jr. of Asheville, president of the Land-of-Sky Chapter of Trout Unlimited. "Donating this computer is just another way of showing how important we think the Commission's work is."

Dr. William H. McCall of Asheville, Wildlife Commissioner for District 9, accepted the computer on behalf of the Wildlife Commission at the Land-of-Sky Chapter of Trout Unlimited's annual fund raising banquet.

"We really appreciate this donation from TU," said McCall. "This computer will be a great help in managing our fisheries resources."

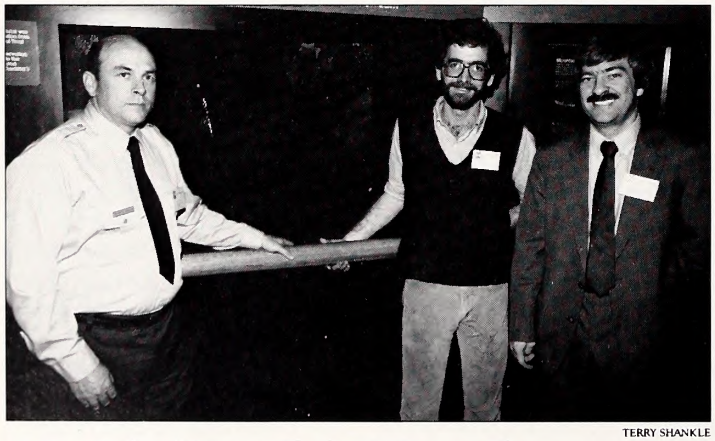
*—Jay Davies*



JAY DAVIES

***Christmas Comes Early:*** *Several chapters of Trout Unlimited recently donated a computer to the Wildlife Commission to be used for fish management programs in the mountains. Seated at the new computer is Jim Borawa, fisheries research coordinator for the Mountain region. Standing, from left to right, are Robert S. "Chic" Webb, president of the Land-Of-Sky Chapter of Trout Unlimited in Asheville, Dr. W.H. McCall of Asheville, District 9 Wildlife Commissioner, and Rod Baird, vice-president of the Land-Of-Sky TU chapter.*

## Installed In Charlotte Park



TERRY SHANKLE

***A Rare Sight:*** *Visitors to Charlotte's Discovery Place may now get a close look at life in a mountain trout stream. The display features a small waterfall, man-made rocks, vegetation, and brown, brook and rainbow trout.*

*The display was built with funds provided by the Rocky River Chapter of Trout Unlimited, and will be maintained by the staff at Discovery Place. Fish will be provided as needed from the Wildlife Commission's Armstrong Hatchery in McDowell County.*

*From left to right are Dick Hamilton, assistant executive director of the Wildlife Commission, Mike Horn, a biologist at Discovery Place, and Allen Baker, president of the Rocky River Chapter of Trout Unlimited.*

## Festival In September

If you're interested in waterfowl and decoy collecting, don't miss the fifth annual Currituck Wildlife Festival. This event will be held on September 13-14 at Currituck High School in Barco.

Displays of antique and contemporary decoys, wildlife carving, and waterfowl memorabilia will be featured. In addition, the North Carolina Duck and Goose Calling Championship and the World Swan Calling Championship will be held.

For more information, write the Currituck Wildlife Guild, P.O. Box 91, Shawboro, N.C. 27973.

*Digit Gnaws A Digit*

## Groundhog Attacks Handler In Class

Wild animals are best left in the wild. This is oft-repeated advice, but not always followed. Even those who work regularly with wild animals, however, can run into real problems. Jane Rohling, the Wildlife Commission's Conservation Education field representative for the Piedmont and a licensed wildlife rehabilitator, related the following incident which happened to her.

"I was scheduled to do a school program on winter wildlife, and happened to know where I could get a woodchuck or groundhog, one of our few true hibernating animals," she said. "Digit, a groundhog that had been dug up by a construction crew in Winston-Salem, had been turned over to Melanie Wells, a wildlife rehabilitator in Greensboro. Digit's three litter mates had been released into suitable habitat to fend for themselves, but Melanie was worried that Digit was too tame to survive in the wild. So she decided to keep him for educational purposes.

"I had seen Melanie and her husband handle Digit with bare hands on several occasions. Digit was now full-grown, and Melanie warned me that he might nip a little. I was never expecting a full-fledged attack, but when I gave the school program I wore a pair of leather gloves just in case. When I took Digit out of his cage to show him to the class, he had other ideas. His strong jaws clamped shut on my little finger, and all four three-quarter inch teeth easily penetrated the gloves and were firmly embedded in my finger. He then proceeded to tug and shake his head like a dog playing with a rag. By the time I was able to pry Digit's jaws open far enough to slip my hand out of the glove some serious damage had been done by Digit to my little digit.

"Now, over three months later, I am still receiving physical therapy to regain full use of my finger. I am also hoping that the nerve damage is going to heal without surgery, and Melanie is still trying to figure out what to do with Digit."

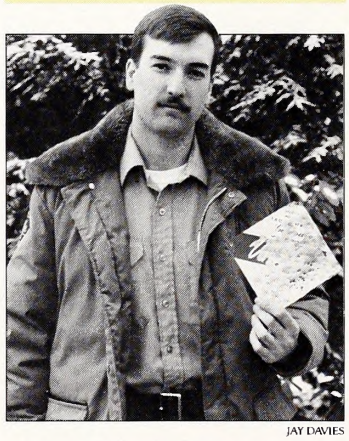
The moral of this story is to leave wildlife babies alone. Many people pick up young animals assuming they have been orphaned. Often, the mother is hiding nearby waiting for you to leave or has simply gone off for a short time to find food. If you are positive an animal has been orphaned, call the Wildlife Commission's toll-free Wildlife Watch Hotline at 1-800-662-7137 and ask for the name of a qualified wildlife rehabilitator in your area. These individuals are licensed to do this work, and will provide the animal with proper care until it can be released back into the wild.

"Don't underestimate the damage that even a small animal such as a squirrel or screech owl can do," said Rohling. "Teeth that can gnaw through hickory nuts, or talons that can break a mouse's back, can certainly poke some holes in you. Also, the bites of many wildlife species are extremely infectious. As I found, it can be a truly painful and expensive experience."

Finally, should you be bitten by your "pet," you may face the painful decision of having to have the animal killed to be tested for rabies. A sad end for both you and your wild friend.

*An Expensive Problem*

## Report Vandalism



JAY DAVIES

***A Real Waste:*** *Trout water signs are not meant to be targets, but vandalism to these and other signs costs sportsmen thousands of dollars annually. In addition to replacement costs, personnel such as officer Keith Templeton of Jackson County spend much time checking and replacing these when they could be working on more vital enforcement and fisheries and wildlife management projects. Anyone having information on vandalism to Commission property or wildlife violations should report these incidents to the Wildlife Commission's 24-hour, toll-free Wildlife Watch Hotline at 1-800-662-7137. All calls will be kept strictly confidential.*

## The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. Interest is earned through investments made by the State Treasurer's Office. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

**Status on March 31, 1986**

| | Numbers Sold | Revenue Received |
|---|---|---|
| Lifetime Sportsman's License | 16,862 | $5,120,410.25 |
| Lifetime Hunting License | 133 | 26,576.25 |
| Lifetime Fishing License | 1,083 | 193,823.94 |
| Lifetime Subscriptions to Wildlife in N.C. | 717 | 86,834.00 |
| Contributions | — | 71,296.90 |
| | Fund Total: | $5,498,941.34 |

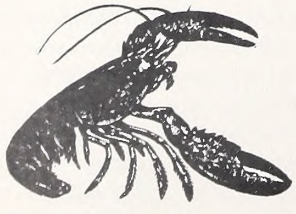
*Do Something For The Ducks*

## Order A Waterfowl Print

***A Beautiful Sight:*** *The 1986 North Carolina Waterfowl Stamp, which features this painting of a pair of Canada geese by well-known wildlife artist Tom Hirata, is currently available from license agents. Art dealers are also currently taking orders for art prints of this stamp.*

## Calendar Of Events

**August 2-3**
Battle Reenactment and Craft Demonstration at the House in the Horseshoe State Historic Site in Sanford. Reenactment of the 1781 skirmish, and demonstrations of colonial camp life.



**August 9**
Shrimp Festivals at Sneads Ferry. Parade, entertainment, and shrimp.

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Byard Ray Folk Festival at Brevard. Features traditional music. For more information contact the Transylvania County Arts Council, P.O. Box 1415, Brevard, N.C. 28712.

**August 18-22**
Coastal Arts, Photography and Crafts Competition at the Roanoke Island Marine Resources Center in Manteo.

**August 21**
10th annual Strange Seafood Exhibition at the North Carolina Mariners Museum in Beaufort. Learn how to prepare and sample unusual seafood. For more information contact the N.C. Mariners Museum, 315 Front St., Beaufort, N.C. 28516.

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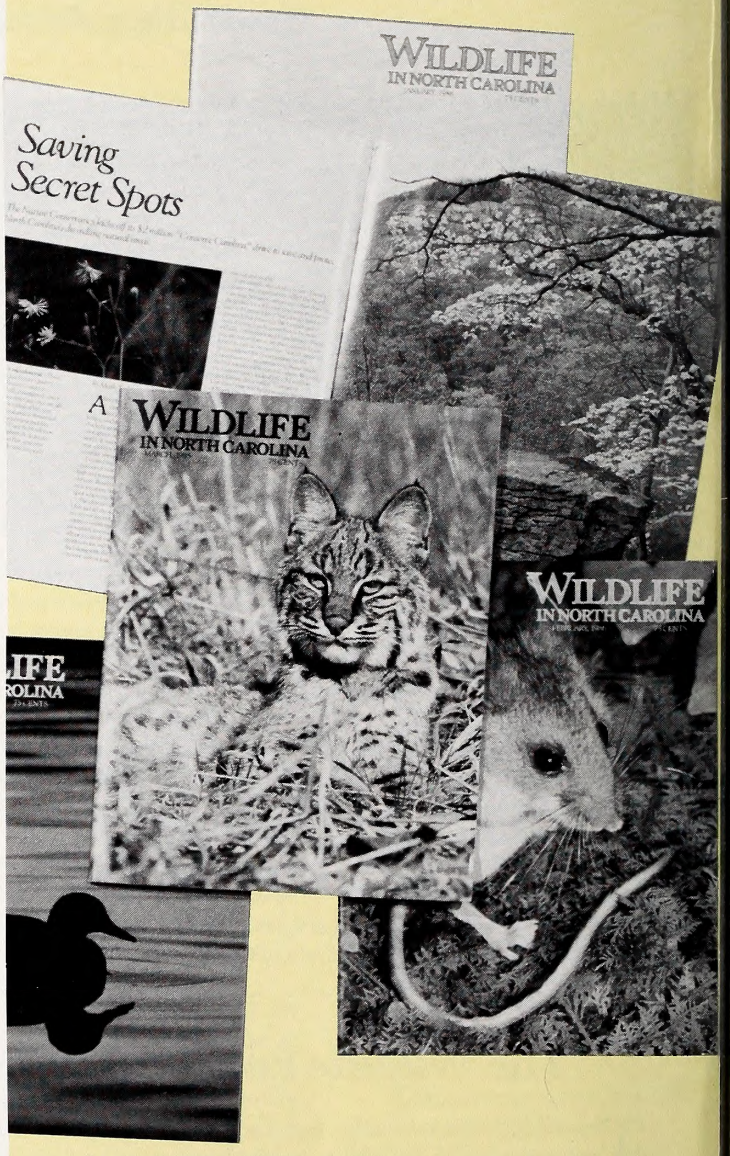


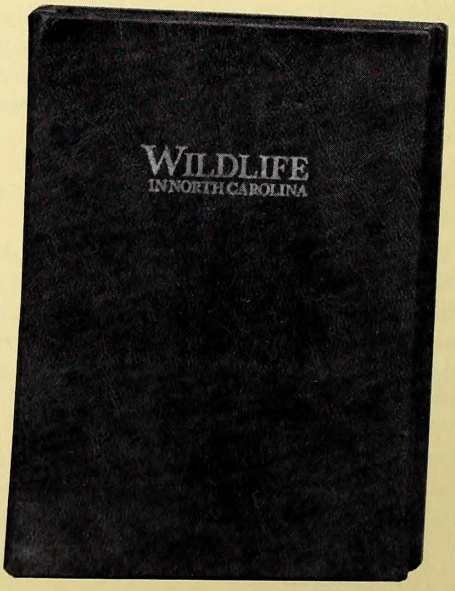

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# WILDLIFE IN NORTH CAROLINA

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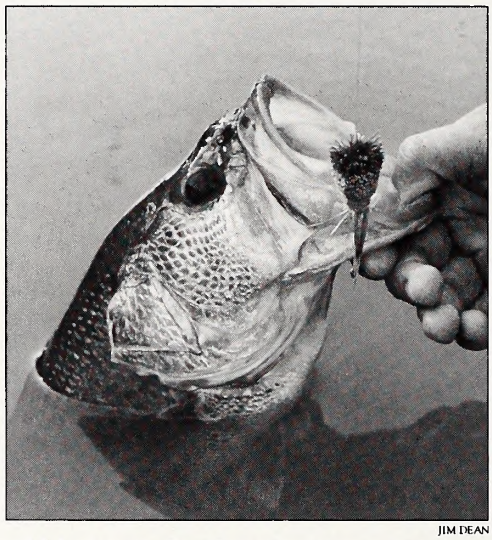
N.C.

# How To Catch A Recycled Fish

*by Jim Dean*

One summer evening while bullfrogs drummed in the cattails and a twilight flight of mosquitoes trilled a few soprano notes, I pulled my boat against the bank of a small pond and sat watching as bats fed on some of the less desirable members of the orchestra. It was a satisfying moment, no less so because I had spent the previous hour catching several nice largemouth bass.

I have been fishing this one-acre pond since 1953. During the past dozen years, brush and trees have grown up around it, and no one else fishes it anymore. Since then, the fishing has improved tremendously, and because I don't fish the pond more than about a dozen times a year, the bass never become too accustomed to seeing lures or bass bugs. Also, because I release every largemouth, I'm not contributing to any decline in the bass population.



JIM DEAN

I know I am fortunate to have such a place to fish, but that's not the point. I'm convinced that if you bulldozed a road to this pond, cleaned off the banks, and gave everyone permission to fish, there would be little reason to want to. Many fishermen would throw back the bluegills that are too small to keep, and keep all the bass—the worse thing they could do. The bass fishing would decline, and with fewer bass to cull the bluegills, you'd soon have a pond full mostly of stunted panfish.

Fisheries biologists have known for years how to manage a farm pond so that it produces good fishing. There are lots of things you can do, and a N. C. Wildlife Resources Commission biologist can help you map out a good management plan that may include fertilization, drawdowns and other tactics. He will also tell you that you should keep the panfish you catch and release most of the bass.

With the right management, a pond can handle lots of fishing pressure. Some of the biggest bluegills and shellcrackers I've ever caught came from a 19-acre pond that is carefully managed. In one year, fishermen kept over 6,000 panfish, and many weighed over a pound—some over 3 pounds! Smaller ponds can also produce big panfish. Another friend has a well-managed one-acre pond that regularly yields 20-ounce bluegills. In both these ponds, all the panfish are kept and most of the bass are released. It's not a total solution, but it certainly helps.

While it's tough to overfish a panfish population, I suspect it's much easier to hurt a bass population. In the small pond I fish, a sizeable percentage of the bass have hook marks indicating I've caught them before. I'm pretty sure I landed one 5 pounder three times last year—twice on a flyrod. You'll never convince me that I couldn't single-handedly hurt the bass fishing on that pond. And so could someone else.

I think much the same is true of many small ponds, and if so, the lesson is clear. If you do nothing else in the way of management, you can help the fishing for both bass and panfish by simply releasing the bass.

In some types of water, the benefits of releasing larger predator fish are even more noticeable. In 1967, I began fishing a small Watauga County trout stream barely 8-feet wide that was stocked and received heavy fishing pressure. If you fished it during the week or so after stocking, you'd catch hatchery trout, but as soon as most of them had been caught, the crowds of fishermen left. During the rest of the year, you'd catch an occasional holdover rainbow, but most of the wild, streambred rainbows were young fish, seldom more than 4 or 5 inches long. Except for rare encounters with sizeable wild brown trout—which is why I continued to visit this stream—there was little reason to fish it.

Four years ago, however, the owner of this water decided to post it, and he hired a caretaker to patrol it simply to keep people he didn't know from snooping around his cabin (he'd had several break-ins). He made no attempt to improve the stream's holding water, nor did he stock it. Indeed, since it was now posted, it was no longer stocked by the state, either.

Because we're old friends and he knows I don't keep fish, he lets me continue to fish, and as far as I know, I'm the only person who still does. The following year, I noticed more wild rainbows and browns than in the past, although most were small. The average size of the trout increased rapidly the second and third seasons, and this past year, the fishing was the best it has been in 20 years.

That stretch of water—like the one-acre farm pond—is testimony to the fact that some bodies of water can produce exceptional fishing if you do nothing more than leave them alone.

This is not an argument against public access, nor does it overlook the need for other forms of management, including stocking when needed. For that matter, there is no reason not to keep a few fish as long as you don't get carried away. A large lake can obviously handle a greater harvest than a small pond or stream, but even on big water, there is growing evidence that anglers may be able to hurt the fishing by keeping too many top-end predators like bass.

The thing to remember is that fish can be caught more than once. And even on the public waters you and I fish most of the time, we can do ourselves a big favor by releasing more of the bass, trout and other predator fish we catch. It improves the fishing for larger species, and helps increase the average size of panfish like crappies, bluegills and shellcrackers.

Most important, it's one type of fish management we can all practice even if we don't own a drop of private water.

September, 1986
Volume 50, Number 9

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*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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**Cover** *The great blue heron is one of the more common wading birds found along the Black River. This one was captured on film by Jack Dermid.*

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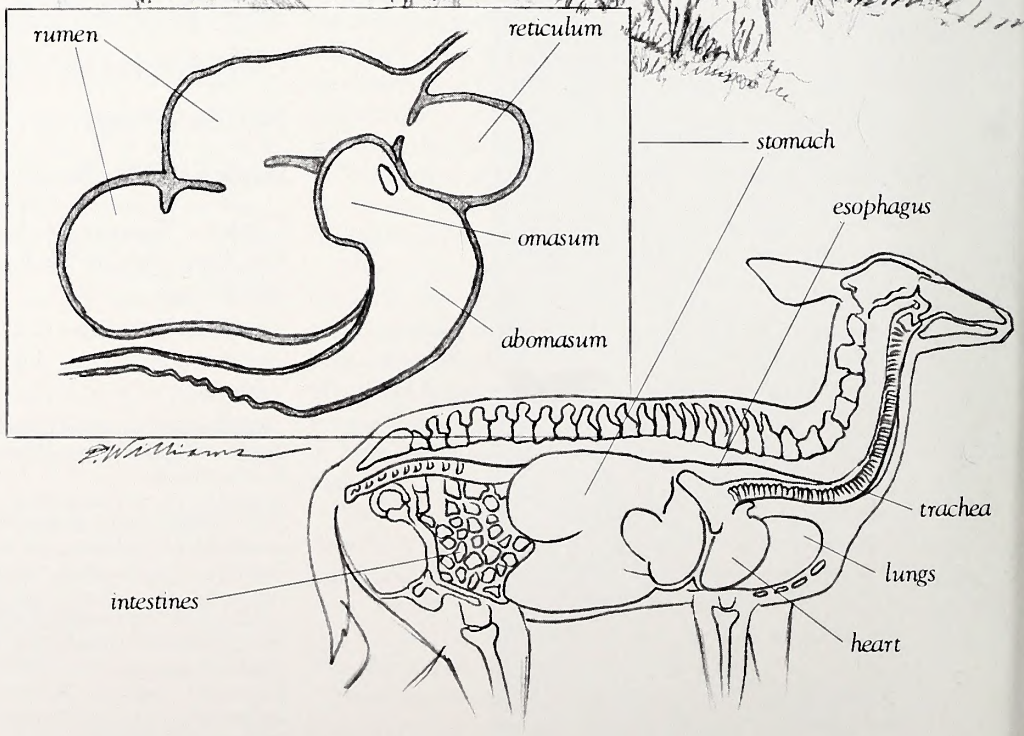
**Whitetails eat** *many plant foods, including leaves, twig ends and grasses. Most animals would find this diet hard to digest, but the whitetail, like other ruminants, has a stomach with four chambers that breaks down tough and fibrous plant foods.*

**When a white-tailed deer** *eats, its food is swallowed rapidly and then regurgitated as a cud for further chewing. Swallowed again, the food passes through the rumen, reticulum, omasum and abomasum for gradual digestion. Micro-organisms in the stomach help to break down this food. Some of these tiny animals may break down certain plant foods more efficiently than others, and if they are not present in the stomach, a deer feeding on these plants can actually starve to death with a full rumen. Such starvation occurs during unusual events such as deep snow when deer are fed foods that are not part of their regular diet. Lacking specific microorganisms to break down these foods, the deer will draw no nourishment from the food it eats and will die. This is one reason biologists often object to efforts to feed deer since it can do more harm than good.*



**What a white-tailed deer eats** *will vary a great deal depending upon the region and time of year. The following are some of the whitetail's most important fall foods.*

*Oak acorns*
*Honeysuckle leaves*
*Apples*
*Persimmon*
*Grapes*
*Rhododendron leaves*
*Greenbrier leaves and fruit*
*Dried leaves*
*Grasses and sedges*
*Mushrooms*
*Gallberry leaves*

# The Whitetail's Stomach

*written by Lawrence S. Earley / illustrated by David Williams*

A vegetable diet poses several difficulties for white-tailed deer and other herbivorous animals. For one thing, plants are not high in energy and so deer must eat a lot in order to get the energy they need. For another, plants are not constant in their nutritional value. Early in the spring, for example, tender new shoots, leaves and grasses are quite high in nutrition, which is good for deer weakened by a food-scarce winter. But by late summer the same plants have dried out and toughened, becoming less nutritious.

A further problem is that plants are fibrous and tough, formed of cellulose and lignin and other woody substances that are hard to digest in the ordinary stomachs of most animals. Moreover, plants' digestibility lessens through the year. New spring growth is the most digestible food, but by winter, according to one estimate, a whitetail is only digesting about 12 percent of what it eats.

Fortunately white-tailed deer have a rather unusual way of dealing with some of these problems. Like other ruminants (cows, sheep, goats, giraffes and antelopes), deer have developed a stomach with four individual compartments —the rumen, reticulum, omasum and abomasum. This multi-chambered stomach allows deer gradually to break down fibrous foods, providing the deer with enough nutrition to take care of its daily needs.

A feeding deer will quickly bite and tear off leaves, twigs or grasses, chew them a few times and swallow them. The food will enter the rumen, the largest chamber in the deer's stomach. If there's a lot of food available, the deer can fill this chamber in an hour. At this point the food is being stored, but already the process of digestion is beginning, for living in the rumen are millions of microorganisms that help to break down the tough, fibrous plants. These bacteria and other microbes soften the food, and as the food ferments in the heat of the deer's stomach, fatty acids are produced and absorbed into the walls of the rumen, an important source of the deer's energy.

These microorganisms are essential to the deer's digestion. In fact, they do more than break down vegetable material. They convert certain nonprotein substances into nourishment.

What is truly unique about the deer's digestive process, however, occurs a short time later when the deer, now under the safety of cover, regurgitates little parcels of the food it has swallowed. While lying quietly, the deer will rechew its cud—Leonard Lee Rue has counted whitetails chewing a cud an average of 40 times —before swallowing it once again. In this way, the deer can recall the contents of its rumen and shred it even more to aid digestion.

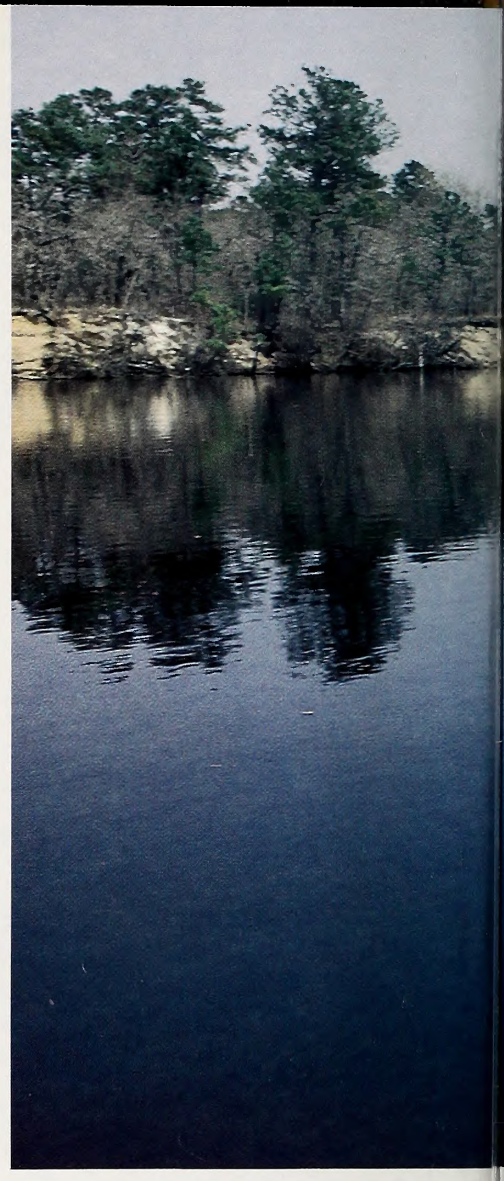
Once the cud is swallowed, it passes once more through the rumen and into the reticulum. The reticulum further aids in the digestive process, but also filters out small stones, pieces of glass and other nonorganic materials the deer might have swallowed. The food now enters the omasum and then the abomasum, becoming more and more liquid as it moves from compartment to compartment. From the abomasum, the food enters the small intestine and what hasn't been absorbed is eventually eliminated in the form of pellets. From swallowing to defecation, the digestive process takes about a day and a half.

The four-chambered stomach has important survival value for the whitetailed deer. Not only does it allow the deer to utilize foods that other animals cannot eat, but it enables the deer to do its real eating after it seeks cover. For a prey creature like the whitetail, this is a survival mechanism of no small value.

# *Exploring* THE BLACK RIVER

## Giant cypress, dark water and intriguing bits of history can be found along this Coastal Plain river.

by Lawrence S. Earley



It was a season of drought when I first visited the Black River in lower Sampson and Pender counties, a time when dust-devils danced across the corn fields and the river ran low with its sandbars showing. The drought seemed to stir memories in the people along the river, as if they were discovering portions of their history exposed in the mud.

I first sensed the powerful pull of the past along the Black on a cool spring night below Fennel's Cove in Sampson County. A handful of fishermen were working the spawning shad using bow nets, a tradition among the people in the upper stretches of the Black. One of them, John Carter, had set me up with my own bow net — two pieces of inch-thick juniper lashed together and then bowed so that the ends crossed. Netting was attached and strips of tensile metal bent to hold the netting open. You stuck your net straight down in the water, open end facing downstream, and watched the shad play in the lazy river. If the shad were a little slow you could watch a lightning bug punctuate the twilight on an arcing flight to the top of a water oak while spring peepers lay down a chorus of song. Then when you felt a bump in the net you twisted its handles and pulled up a piece of electric energy, iridescent pinks and golds twisting in the net. At least that's what John did when he pulled up his net with a little female shad in it, which he called a roe.

"I caught five the other night," John said. "Caught a roe and two bucks with one scoop. But there haven't been half the shad as last year."

Pete Johnson expressed similar sentiments a little later when I found him sitting in his boat and waiting for the sudden bump of the shad in his net. "Twenty-five years ago, there were 150 bow-netters up and down the river this time of year." Johnson said. "Now count 'em."

JACK DERMID

***Cooters and sliders*** *soak up the sun along the Black River.*

In the two months that I traveled the Black River, from its headwaters to its mouth, I heard this refrain over and over— the river's present couldn't hold a candle to its past. It was as if the present had entirely evaporated, leaving only a bittersweet residue of memory.

Indeed, the casualties of time on the Black have been many, besides the numbers of shad and bow-netters. Gone are the tar kilns smoking in the longleaf pines, the

KEN TAYLOR

***The sinuous meanders*** *of the upper Black River are evident in this aerial photograph.*

LAWRENCE S. EARLEY

***Dark water** holds colorful reflection of this kayaker as he pulls easily down the Black.*

noisy activity at the river landings where steamboats once tied up, the shouts of rafters threading their loads of turpentine through a narrow meander. And yet, I found more than memories on the Black. True, what river settlements there had been were long gone, but I marveled to find no industries polluting its waters or water-treatment plants sucking it dry. The river was no longer the commercial thoroughfare it had once been, but no dams interrupted its course, no reservoirs played havoc with its flooding patterns.

What I had found, in a word, was something unique among coastal rivers—a river that had shrugged off man's hand and was quietly maintaining its ancient ways.

Let's begin our journey of discovery at the Black's headwaters in lower Sampson County. Stand with me as we watch Six Runs and Coharie creeks join to form a shallow, twisting river that will gradually deepen and widen over its 66-mile length before emptying into the Cape Fear River 14 miles above Wilmington. A little above us, and lost in the woods on the east bank of Coharie Creek, are the remains of Lisbon, the earliest town on the Black.

Not far from its headwaters, the river runs past Clear Run, an old landing where A. J. Johnson ran a store and a turpentine still back in the 19th and early 20th centuries. Standing at Clear Run bridge one early evening, I saw that the drought had uncovered a page out of the history of Black River transportation. The languishing sun had lit the rotting hull of a wooden boat resting on its side in the shallows.

"That was my daddy's steamboat," Elizabeth McLamb told me later that night. "My daddy was A. J. Johnson and he built that boat in 1899. One day in 1914 a severe storm struck and the boat sank. Fifty years ago, when my husband and I were first married, we could walk out on the boat to fish. Of course time has taken hold now."

Seeing the sunken vessel reminded me of how important river transportation was to the early settlers. Rivers were virtually the only avenues of commerce because the roads were few and dangerous. Towns rose and fell as transportation changed.

The steamboats came late to the Black River. They had been in use on the Cape Fear by 1818, but it wasn't until after the Civil War that they had begun to run on the Black, according to F. Roy Johnson, whose *Riverboating in Lower Carolina* is the definitive study of early river transportation. Before that there had been the rafters and poleboatmen, a hearty breed that rode the river into the late 19th century, well after the steamboats were in use. From as far away as Lisbon and from the landings up and down the river's length, rafts floated barrels of naval stores and great loads of cypress. It was a dangerous life for the rivermen, for submerged logs and drifting flotsam easily

LAWRENCE S. EARLEY

***Exposed sandbars*** *at river's headwaters reveal hazards of upper Black for steamboat navigation.*

# *Exploring* THE BLACK RIVER

overturned their craft, especially during spring freshets. No wonder the boatmen were a swaggering bunch by the time they reached Wilmington.

The first Black River steamboat was the *Little Sam* which operated in 1870 between Wilmington and Point Caswell, a young and growing town in Pender County that quickly became the center of shipbuilding on the Black River. For awhile, Point Caswell was the head of steamer navigation on the river. The river along these lower reaches is broad, and more important, deep—24 to 26 feet in spots. In upper Pender and lower Sampson counties, the river was constricted and shallow, a hazard of sunken logs and invisible sand flats. But by 1885, the U. S. Army Corps of Engineers was dredging the upper Black, and steamers were making twice-weekly trips to Clear Run nine months out of the year.

About 11 miles downstream from Clear Run is Ivanhoe, a former railroad town that got its name from bookish folks who loved Sir Walter Scott. One Sunday morning, at the river's edge near town, I gaped at the effects of the continuing drought and wondered how 85-foot-long steamboats could have ever negotiated the shallow meanders of the upper Black River. At the historic Black River Presbyterian Church later that morning, the Rev. Phillip W. Thetford read from Psalm 69, "I have come into deep waters, for the flood sweeps over me," and I hoped he would be right. Clouds were forming overhead, but when the service was over only a few large and heavy drops fell, leaving craters in the dust.

In the cool interior of the 127-year-old church, Caroline Dellinger of Ivanhoe recalled the excitement of her first trip to Clear Run aboard a steamboat. "When I was quite a child," she said, "the captain brought his wife and daughter with him on the boat. When they got to Delta Landing, a little above where Ivanhoe is now, my sister and I boarded the boat and it carried us to Clear Run. We spent the night on the boat. And it was a thrill! It was like going to New York now. I had never been to Wilmington then."

Wander through the cemetery of the Black River Presbyterian Church and look at the names on the headstones. Bannerman, Murphy, Robinson, Beatty, Corbett—Scots all, they immigrated to these shores throughout the 18th century after humiliating defeats at the hands of the British. The Scots must have found the Black River country as alien as anything they had ever seen. Accustomed to rock and peak and limpid loch, they now beheld haunted swamplands that yielded under their feet and that sometimes stretched for miles along the river. Wolves howled, bears roamed from ridge to bottom, and the cries of Carolina parakeets resounded through the bottomlands. The higher ground was no less forbidding, despite the sandier, better

LAWRENCE S. EARLEY

***Elizabeth and W. I. McLamb*** *sit in front of their 19th-century home at Clear Run, a former riverboat landing.*

drained soil. This was the "pine barrens," part of a vast southeastern forest of longleaf pine trees and their reservoirs of resin, the source of turpentine, tar, pitch and rosin—naval stores.

Ivanhoe thrived beyond the passing of the steamboats, the last of which ran the Black in 1924. The steamboats' coming had gradually sucked the commercial life from Lisbon, and their end signaled the demise of Point Caswell, the boatbuilding center. Although a village had existed near Ivanhoe since the mid-18th century—the Black River Presbyterian Church was formed on the river's banks in 1740—the town prospered as a railroad stop and only failed when highway construction diverted goods from railroad to truck. Today, Ivanhoe faces an uncertain future.

A few miles below Ivanhoe, the South River flows into the Black, its entrance marked by a bald cypress tree that leans across the mouth of the river. One of two tributaries of the Black, the other being Moores Creek in Pender County, the South rises in Harnett County, its name referring to its location south of the Black River—it ought properly to be called the South-Black River. On 18th-century maps, it is called the Black River, which has occasioned some confusion, and even today the people of Harnett County call the headwaters of the South the Black River.

It's no accident the river is called the Black. One 19th-century traveler described his first visit to the river in this way: "Arrived at Black River pretty soon this morning; a terrible place; water black as tar..."

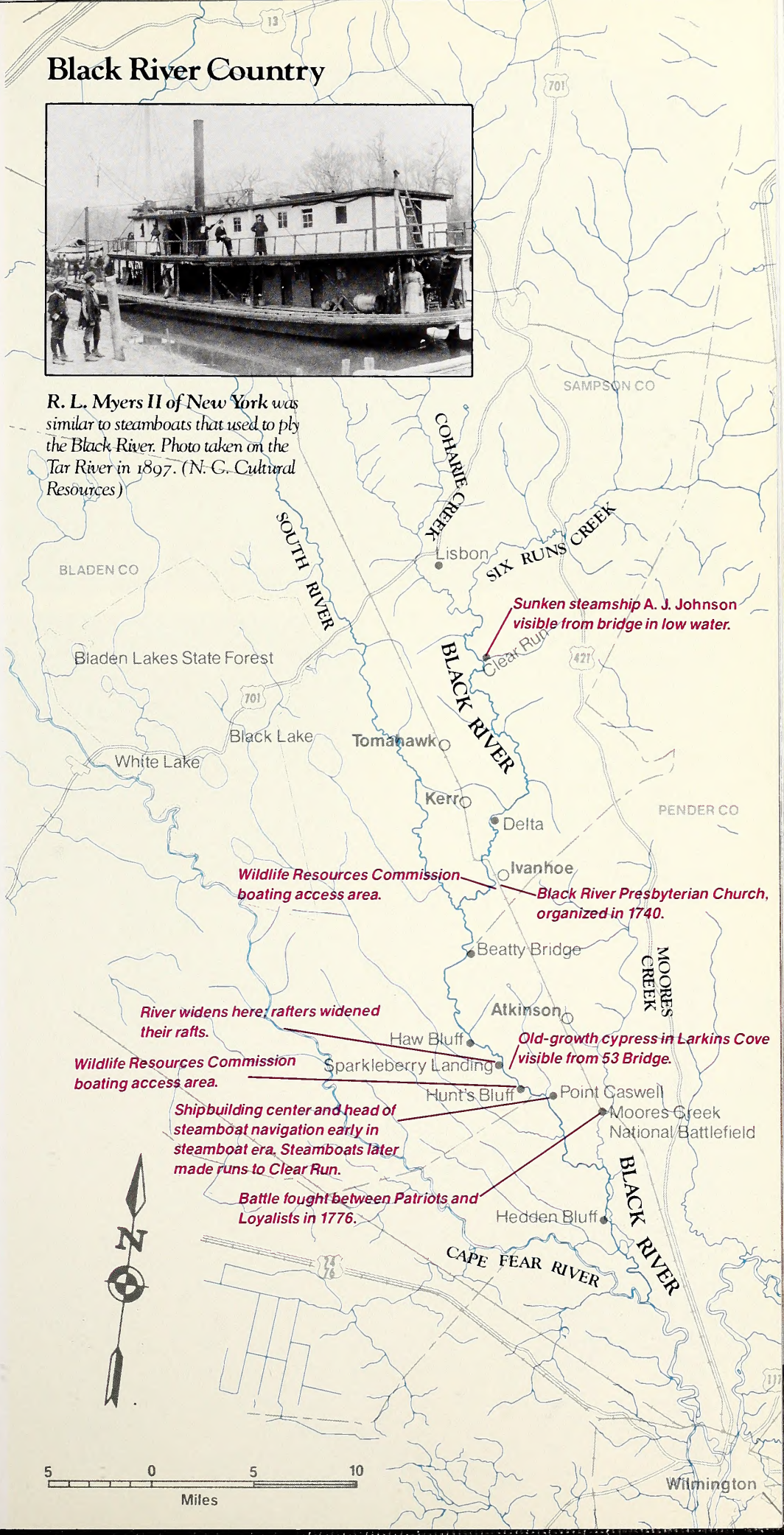
Although naval stores, including tar, were produced in great quantities along the river, that's not where the river got its color. I talked to Merrill Lynch, ecologist for The Nature Conservancy and expert on river systems, about the subject. Lynch divides coastal rivers into two types, brownwater rivers and blackwater rivers. "Brownwater rivers are full of silt," he said. "These rivers—the Neuse, the Cape Fear, the Roanoke—have their drainage basins up in the Piedmont and mountains and they're draining fine clays and silts from Piedmont crystalline rocks. Blackwater rivers, like the Waccamaw, the Black and the Lumber, are pretty much limited to the Coastal Plain. They don't have the sediment deposits and the water chemistry is more acidic."

The tannic acid that stains the water comes from the acid soils and the organic material that builds up in the broad forested bottomlands along the river. There's an ongoing exchange between the swamps and the river channel, as tannin-loaded water ponds up and slowly leaches into the river.

## Black River Country



*R. L. Myers II of New York was similar to steamboats that used to ply the Black River. Photo taken on the Tar River in 1897. (N. C. Cultural Resources)*



# *Exploring* THE BLACK RIVER

Despite its color, area residents brag about the water, saying that it's as unpolluted as you'll find anywhere in the state. "I wouldn't hesitate a minute to drink it," says Howard McKenzie, wildlife enforcement officer who patrols the Black River.

The Black crosses into Pender County below Beatty's Bridge, where the Corbett mansion has commanded a scenic view for nearly 130 years, one of the few plantation-sized houses still visible from the river. A few miles below the bridge, the channel narrows and almost disappears entirely among the cypress swamps.

One spring night, I canoed into a portion of these cypress swamps, a maze-like area where the river braids into several distinct channels. Earlier that day, we had marveled at the way the cypress seemed to stand in ranks, shooting up alone above the sub-canopy. We had gaped at the broad and flattened tops of the trees, the enormous swells of their buttresses. That night we floated silently under a moonless, starlit sky in a little enclosed bay we dubbed "The Gallery." Overhead, the great bulk of the cypress canopy interrupted the sky. Nearby was Haw's Bluff where a ferry operated for years and Mill Creek where a village prospered and then disappeared, but the cypress stand we were in predated European settlement by nearly a thousand years.

"I'll say this, the Black River is one of the best tree-ring sites in the world," said Dave Stahle, a dendrochronologist from the University of Arkansas at Fayetteville.

For the past two years, Dr. Stahle and his colleague Dr. Malcolm Cleaveland have been studying old-growth bald cypress stands throughout the Southeast. As a dendrochronologist, Stahle is interested in dating ancient environmental events by studying growth rings in trees. He's concentrating on bald cypress because of its extraordinary sensitivity to climate, especially to drought. Alerted to a 10-mile stretch of Black River cypress by biologists from the state's Natural Heritage Program, Stahle and Cleaveland were startled to find that tree after tree dated back 1,000 to 1,200 years.

"The Black River is unique in several respects," Stahle told me. "First of all, it's got real old trees. It's got the greatest concentration of old-growth bald cypress trees that we have found anywhere. It's also one of the two or three least disturbed bald cypress forests that we know of."

Stahle says that there are pockets of truly virgin bald cypress swamp forest throughout the area, which is unusual because cypress was a prime lumber species, and most virgin stands were logged out long ago. Why not the Black's? "I think everybody pretty much agrees that these trees along the Black are defective lumber," Stahle said. "There are a lot of shakes in the wood. A lot of trees are partially or completely hollow."

The scientists' discovery has excited North Carolina conservationists who see

LAWRENCE S. EARLEY

these old trees as remnants of the original cypress forests that once flanked North Carolina's eastern rivers. "The Nature Conservancy is interested in designing some sort of protection plan for that river, and specifically for the areas that contain the old-growth timber," said Merrill Lynch. "The Conservancy considers it a high-priority area because of the value of the old-growth cypress. It's one of a kind."

Added Stahle: "I think it's national-park quality. I cannot emphasize how valuable that area is from a scientific point of view."

At Haw's Bluff, Paul Turlington has restored an old house and planted a flourishing garden. I asked him one night how he felt at having such ancient trees for neighbors. The retired engineer took a philosophical view. "They've been here longer than I have," he said, "and I hope they'll be here longer than I'll be around. I'm a daydreamer, let's face it. I like to think about how long the river has been running by my house and how long it'll continue to run after I'm gone."

His stories of the wildlife he's seen along this stretch of the Black were astonishing. Deer herds crossing the river in the still moments just before dawn. The flock of ibis that lit into a small cypress down by his dock. So many hummingbirds that he had to fill his quart bottle feeder three times a day. "Just like a beehive," he said.

Below Haw's Bluff, the river alternately swells and constricts, beautiful in the spring with purple blooms of wisteria trailing in the water and nesting prothonotary warblers flashing through the thinly leafed trees. There are few houses to be seen, a rustic cabin every now and then or a fish camp on a high bluff. Limbs of river birch arch over the river at one spot.

The river broadens as it nears N. C. 53. At Sparkleberry Landing, a mile north of the bridge, rivermen would put in and widen their rafts to float the last 39 miles to Wilmington. The river winds past the remains of Point Caswell and bends just where Moores Creek enters the river from the west. Not far from here, at Moores Creek Bridge, Patriots and Tories fought a crucial battle in 1776 that effectively destroyed the Loyalist forces for the duration of the war. Visitors can retrace the steps of both sides at Moores Creek National Battlefield near Currie.

***Old-growth cypress trees** rise above the sub-canopy along the Black River. The river's swamp forests contain extensive stands of some of the oldest bald cypress in the Southeast.*

LAWRENCE S. EARLEY

***John Carter** displays single shad caught in his bow net. In the narrow stretches of the upper Black, fishermen traditionally use bow nets to fish the spring shad runs.*

JACK DERMID

***Prothonotary warblers** are permanent residents along the Black River, building their nests in Spanish moss festooning cypress trees.*

It's in these lower stretches of the Black River that sturgeon are caught each spring. The Atlantic sturgeon is the largest fish caught in North Carolina's inland waters—some of them weigh more than 400 pounds. Crawford Marshall of Currie has been a long-time logger and fisherman along the Black and knows sturgeon fishing as well as anybody.

One May afternoon Marshall put out his nets and we sat waiting for the river to change directions. The sea's tidal influence is felt all the way up to Point Caswell, a phenomenon that rafters made use of. Not only could they ride the tides down, but they could also ride them up on their return.

"When we get a change of tide, that's when the sturgeon really jump," Marshall said. "The smaller ones'll clear the water, and them big ones don't get out over halfway. He'll shoot up so far and when he comes down it sounds like someone's throwed a log in the river."

We waited awhile and suddenly I noticed that the river that had been running downstream had now reversed its direction. A few hours went by but we didn't hear any logs or net any fish either. Marshall told some stories about logging and sturgeon fishing along the Black. Finally he pulled in his nets. "Your better time is at night," he said. "They're pretty hard to get in the net in the daytime."

Hedden's Bluff is only 13 miles above the Cape Fear, but for a trio of state underwater archaeologists one morning we were in another dimension altogether. The three —Richard Lawrence, Leslie Bright and Mark Weil-Ramsing—had been making slow runs past the Bluff, an old landing. With their magnetometer registering a

***Late sun** rouges Carolina willow trees along the lower stretches of the Black River.*

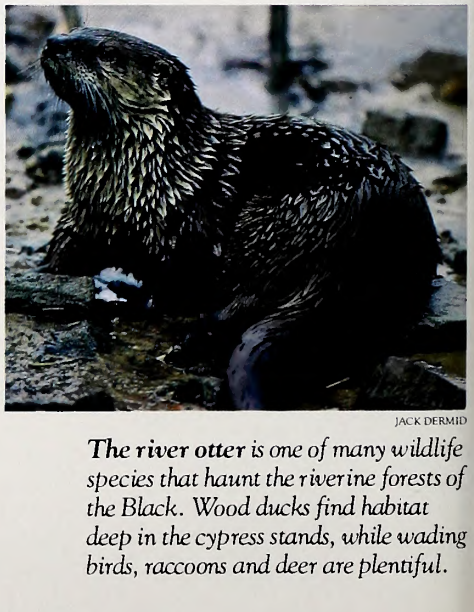
## *Exploring* THE BLACK RIVER

disturbance right in front of the landing, Lawrence and Weil-Ramsing donned scuba equipment and jumped over the side of their 27-foot McKee to investigate. On the bottom might lie another piece in the puzzle of Black River history.

"The Black River is an area we've been particularly interested in because there was a lot of early activity along the river," Lawrence had said earlier. "Compared to the Cape Fear River, the Black is relatively small and we've got good historical information about it. What's nice is it's deep enough so that there haven't been a whole lot of improvements to navigation, dredging and construction of locks and dams, things of that sort. So it's likely that things that have sunk would be left undisturbed."

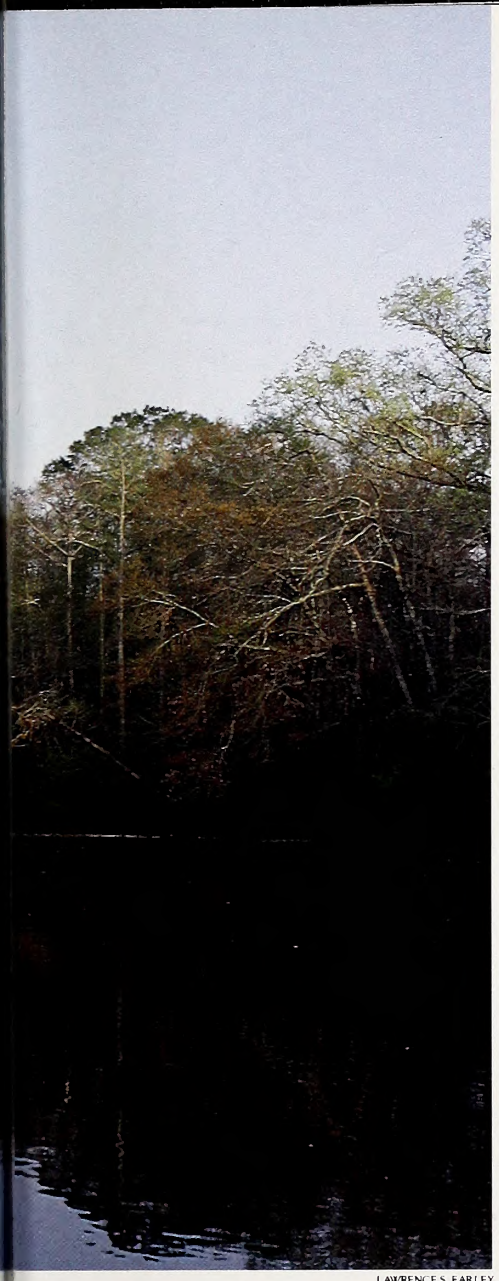
The archaeologists were particularly interested in recovering steamboat remains. The Black River, with its visible and not-so-visible hazards, claimed at least seven vessels during the steamboat era, and some of them are still in the river. According to one river legend, the captain of the steamboat *Delta*, passing Point Caswell at 2 a. m. vowed he would make Delta Landing by daybreak or blow himself to hell in the process. This Captain Ahab did just that a short time later, when the boiler blew, lofting the fireman through a cypress tree nearby. His tattered shirt hung in its branches for months afterwards.

"The Black is like a lot of other coastal rivers," Lawrence said, "Today you can go



JACK DERMID

***The river otter** is one of many wildlife species that haunt the riverine forests of the Black. Wood ducks find habitat deep in the cypress stands, while wading birds, raccoons and deer are plentiful.*



LAWRENCE S. EARLEY

LAWRENCE S. EARLEY

***The tannic water** of the Black is superb habitat for redbreast sunfish, a favorite of southeastern anglers. Wendell Evans paddles his boat past the Corbett House near Beatty's Bridge.*

LAWRENCE S. EARLEY

***Ancient cypress** along lower Black still carry the rings used to tether steamboats. While the steamboat era has long passed, the old cypress are the focal point for renewed interest in the Black by conservationists.*

miles without seeing any activity along the river, and the old landings are no longer used except by fishermen. But in the 19th century people relied on them for transportation and they were used all the time."

No boats were found that day, but the archaeologists found some solace in retrieving the neck of a jug and some earthenware pottery that dated from the early 19th century, showing that the landing had been in use at least since that time.

As we headed to Wilmington at the end of the day, the wide, straight vistas of the lower Black made the upper river seem like a tortured creek in comparison. Where the Black emptied its tannic waters into the brown stream of the Cape Fear I thought of Blake Warren who in the 1860s had rafted logs and turpentine to Wilmington from Coharie Creek, and then walked the 85 miles back to save the dollar railroad fare that would have brought him within 17 miles of home. He followed a path on the river bank worn by generations of rivermen, and I imagined that if he came back today he might be puzzled by the quiet, but he would still recognize the river. You can't always say that about a river in North Carolina.

By the way, it finally rained in Sampson and Pender counties and I was there to see it. One Sunday in June, I was chatting with Wendell Evans of Magnolia who was tossing a lure from his boat into the shoreline cover for redbreast. "I've been floating the Black for 10 years now," he was telling me, "and it draws me back like a magnet. Of course the fishing's not as good as it was." Again, the obligatory nod to the past.

But then it thundered, and soon the heavy drops were pocking the surface of the inky water. Beatty's Bridge was handy. Under the bridge, we hunched our shoulders against the mist and watched a gray scourge of slanting rain lash the river into a froth. That's when I realized that time's tide hadn't really gone out on the Black. The river had lost its old identity as a commercial highway but conservationists were only now recognizing its unique contributions to North Carolina's rich natural heritage. For here was a river that yet followed its ancient course and in its bottomlands, still holding sway, were the cypress patriarchs carrying news from a distant age.

I decided I was looking forward to seeing what the future would hold for the Black River. I was looking forward to seeing the river rise. ⊠

# Rails Along The Outer Banks

## Clapper rails offer great sport in many coastal marshes this month, and it's different from any other hunting you've ever tried.

by Curtis Wooten

JOEL ARRINGTON

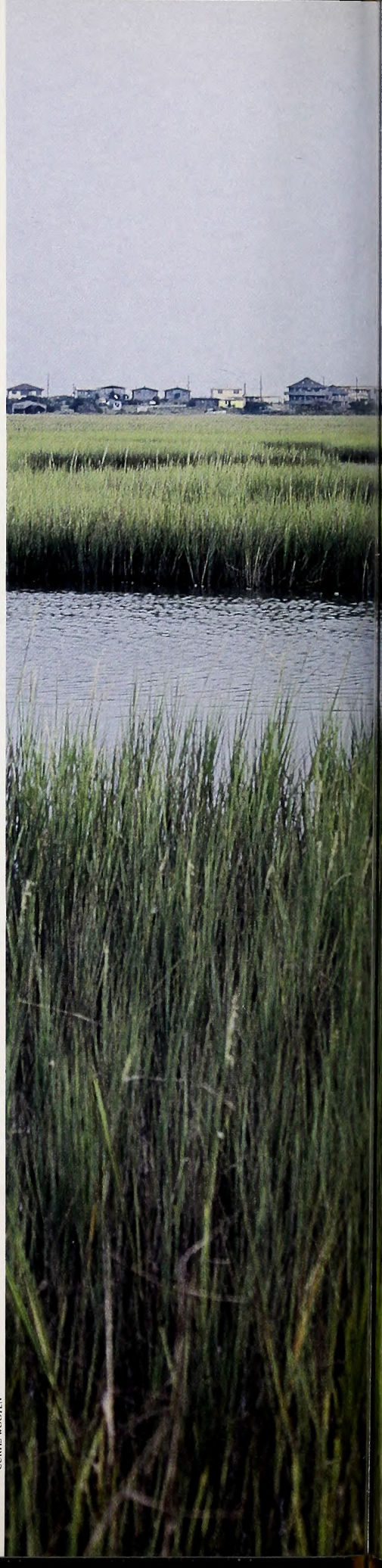
The sun hung heavily in the western sky, backlighting clouds and basting us with late summer heat. Its brilliant light danced across the marsh, turning every inlet and pool into a shimmering body of silver. The quiet of the September marsh was broken only by the hum of mosquitoes, the rhythmic crashing of waves upon the distant beach, the intermittent call of a gull, and the occasional clack and grunt of a rail.

The outgoing tide carried the johnboat I was poling almost effortlessly through the channels that threaded the marsh. My brother, Alfred, stood expectantly on the bowplate, shotgun cradled in his arm, homing in on the sound of each rail call, and pointing out water trails that might lead us to within shooting range. It was late September, opening day of the rail-hunting season, and we were trying our hand at bagging a few of the elusive birds.

It was through the flip of a coin that Alfred wound up on the bow of the boat with gun in hand, and I on the stern with a 12-foot pole, the traditional way to hunt rails along the North Carolina coast. Since colonial times hunters have waited for a high tide to put water deep enough over the marsh to pole a flat-bottomed skiff through with minimal exertion. In the old days, you could hire someone to pole you through the marshes for a pleasant afternoon of shooting, but that is no longer the case. The best you can hope for today is to convince a son or nephew that an afternoon of poling would be excellent preparation for the winter basketball season (strengthening the torso and all that). Failing that, try convincing a hunting partner that an afternoon in pursuit of rails would undoubtedly improve his wingshooting when the woodcock and quail season open. Of course, following the latter tack generally requires that both hunters pull a stint in the stern of the boat, a major drawback.

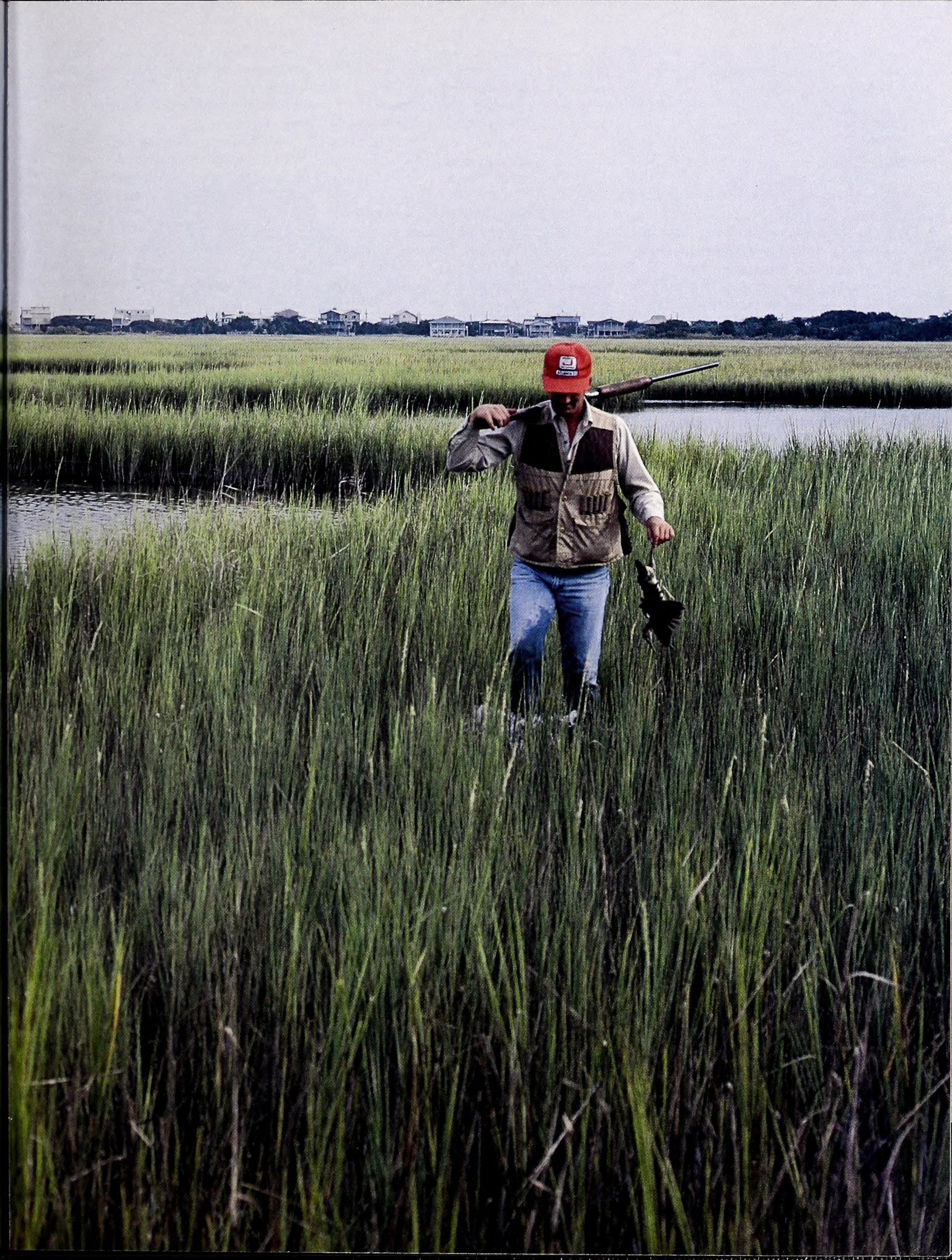
Alfred and I have spent many days afield in pursuit of quail, woodcock, snipe and other upland game birds over the past 20 years, so I had little problem convincing him that we should try our hand at bagging a rail or two. As I leaned laboriously on the pole, I noticed that he was overtly enjoying the first leg of the hunt, and contemplated, momentarily, jockeying the boat into a partially submerged stump to test his skills at walking on water.

We had missed high tide and when our hunt got underway the only way to traverse the marsh in a boat was to follow its myriad creeks and channels. After an hour or so of sometimes strenuous exercise, which produced a couple of flushes of birds out of range and numerous groundings on oyster beds, I called a meeting of the hunters present and suggested that we go to rail-hunting plan "B", whatever it might be. By this time the tide was well on its way out and much of the marsh was exposed, possibly



CURTIS WOOTEN

***Rail hunting** is a traditional sport each fall in many coastal marshes, and it's a sport that offers fast shooting for abundant birds in a unique setting. You can hunt on foot in some marshes at low tide (right), or pole a skiff through the flooded grass on high tide.*



lending itself to foot traffic. We decided to retreat to the Intracoastal Waterway to study the situation.

As we found our way through the tidal creeks back toward the Waterway, we flushed another rail (out of range, of course) which settled down 100 yards away in a part of the marsh far from a water trail. We decided to pursue.

It quickly became obvious why rail hunting is not generally practiced on foot in the marsh, even on the highest portions. Duck hunters and ditch diggers are familiar with the sensation of going shin-deep in muck with every step. So are those who pursue rails. Such "hunting" is good exercise for the hunter, but it's difficult to cover much territory, and after a while it grates on the nerves, and under the best of conditions the most that a hunter on foot could hope for would be a couple of shots in an afternoon of hunting. Not much of a payoff for such hard work. I should add, however, that I have friends who tell me that some marshes can be walked easily at low tide, and all you need is sneakers to protect your feet from sharp shells.

It didn't take us long to decide to return to the boat and continue our retreat to the Intracoastal Waterway. There we pulled the boat up on a sand beach and stepped out on the old, eroded spoil berm created years ago when the Waterway was first dug. Walking to the marsh side of the berm, we found that where the soil had washed into the marsh a pathway had been formed that would support foot traffic. I clapped my hands and in the distance down the waterway, a clapper rail responded to the sound with its characteristic clack. We began moving in that direction.

Within 100 yards, a rail flushed to Alfred's right and a snap shot brought it down. Fifty yards farther, a pair flushed and a shot from each of us brought them to bag. An hour later and a mile and a half down the Waterway, we had a dozen birds to our credit and called it a day.

When I say that Alfred and I were "rail" hunting, it's like saying that we were "duck" hunting. "Rail" is a generic term which covers several species of birds. Four species of rails are found in North Carolina (clapper, king, sora and Virginia) and we were subject to flush any of them in that Topsail marsh. As it turned out, all the birds we bagged were clapper rails, the most numerous of the rails generally found in Carolina salt marshes. Clapper rails are very common permanent residents of salt marshes,and their numbers increase in the fall with the arrival of northern migrants. The king rail is also a permanent, though less numerous, resident but it prefers brackish and fresh water marshes to the salt variety. Sora and Virginia rails are nearly as numerous as the clapper rails in the fall, but they are not permanent residents. They begin arriving in August from their northern breeding grounds and generally linger until May. Rails have a varied diet which includes seeds, berries, snails, insects, small crustaceans and other aquatic animals found in the marsh.

Although Alfred and I wound up with a very successful hunt in the extensive marshes behind Topsail Island, there is equally good rail hunting in the marshes that back virtually all the coastal islands from Sunset Beach to Baldhead and northward to Virginia. The marshes of Bogue Sound generally offer particularly good rail hunting, as do the marshes inland of Cape Lookout from Harkers Island to Cedar Island. Though I am less familiar with the marshes of Pamlico and Albemarle sounds, the birds range there and, no doubt, offer memorable hunting opportunities.

Chances are rail hunting will never seriously compete with quail or dove hunting for the attention of sportsmen, but if the prospect of an early fall afternoon on a Carolina marsh with plentiful birds at hand and few, if any, other hunters in sight appeals to you, then give rail hunting a try. It can be strenuous, and it is invariably muddy, but it's also a whole lot of fun! The season opens on September 15, and runs through November 22. Check your regulations for bag limits since they vary for different species. ⊠

## Savory Rail

Recipes for rail generally are not numerous in most wild game cookbooks, but recipes for quail, woodcock, snipe and rail are interchangeable, so finding a recipe that suits your taste presents little problem. A dressed rail is a bit larger than a woodcock, and tastes like a woodcock or snipe. Simple cooking is recommended. Since the birds' breasts generally have little fat, the cook should use butter generously to maintain moisture, but rail fanciers recommend little or no seasoning, and no salt during cooking.

The birds can be either plucked or skinned, but since most of the edible meat is contained in the breast, most rail hunters simply pop the breast out, as they do with doves, and use their favorite recipe to prepare them for the table. Two of my favorite rail recipes are "Rail in Casserole" and "Roast Rail."

### Rail In Casserole

*Milk*
*Flour*
*Clarified Butter or mild cooking oil*
*Black pepper*
*White wine*
*Sour cream*

Preheat the oven to 375° F. Split and clean 4-6 plucked birds and press with palm of hand to flatten, or use 6-8 rail breasts. Dip each piece in milk and dredge in plain flour. Brown in deep, hot, clarified butter or mild cooking oil, or a mixture of oil and butter. Arrange the birds in a heated, oven-proof casserole. Pour remaining butter over the birds, lightly dust with pepper and add a little white wine to moisten. Cover and place in oven. After about 20 minutes pour sour cream over the birds and continue baking, covered, until tender. Serve very hot on rounds of dry toast, with the birds' own sauce from the baking dish.

### Roast Rail

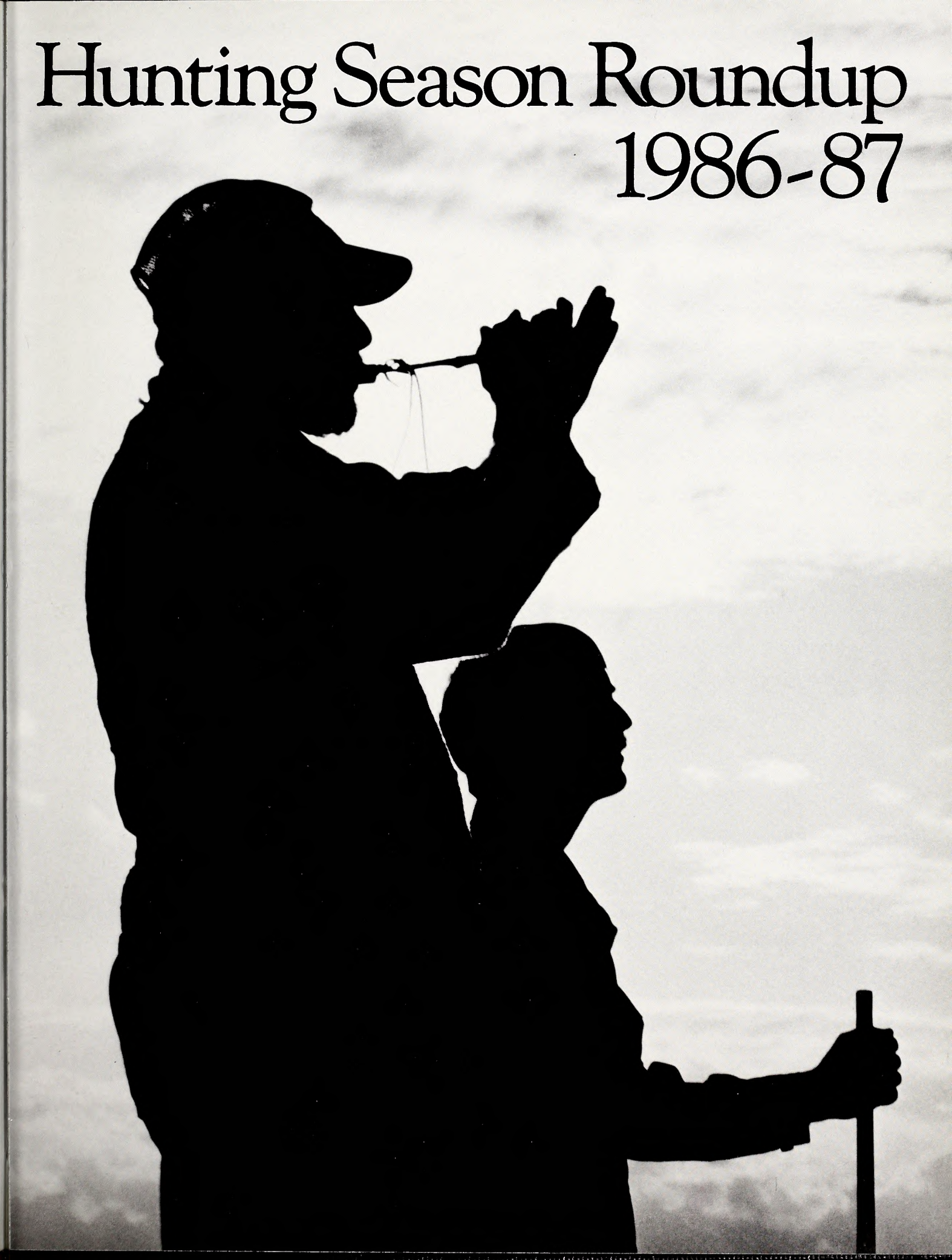
*Butter or margarine*
*Bacon slices*

Pluck and draw or split the birds to clean. Get a good hardwood fire going (in an outdoor fireplace, wood stove, or indoor fireplace) and build up a bed of coals. Wash the dressed birds in clear cold water, drain, and pat dry with a towel. Probe for and remove any shot, and trim damaged parts.

For drawn birds, insert a marble-size chunk of hard butter or margarine or a small curl of fat bacon into the cavity of each bird. Truss, wrapping a thin slice of bacon, spiral fashion, around the bird and securing it with toothpicks. Fasten the bird onto a spit or forked stick. Rub with butter, and broil over the coals, turn and basting with melted butter almost constantly for 15 or 18 minutes, or until the bird is tender and golden.

For split birds or breasts, flatten and rub with butter. Place in a hinged wire toaster or grill and hold over the hot coals, skin side up, for a couple of minutes to sear the underside. Baste the top with butter, and turn to sear the skin side. Baste almost constantly and turn frequently until the birds are tender and golden. Split birds broil very quickly—in 10 to 12 minutes. Don't overcook.

# Hunting Season Roundup 1986-87



# North Carolina Hunting Seasons 1986-87

| Species | Hunting Season | Daily Limit | Possession | Season |
|---|---|---|---|---|
| Dove | Sept. 1-Oct. 11<br>Nov. 24-Nov. 29<br>Dec. 19-Jan. 10<br>Shooting hours are from one-half hour before sunrise until sunset. | 12 | 24 | None |
| Crow | Thurs., Fri., Sat. of each week from July 1 to Feb. 28 and from June 1 to June 30 plus Labor Day and Christmas Day | | No restriction | |
| Deer | | | | |
| Bow and Arrow | Sept. 8-Oct. 4 (*Eastern) | 2 | 2 | ****5 |
| | Sept. 8-Oct. 4 and Oct. 13-Nov. 22 (*Western, except Yancey County) | **2 | 2 | **4 |
| | Sept. 8-Nov. 8 (*Central) | 2 | 2 | 4 |
| | Sept. 8-Nov. 15 (Northwestern) | 2 | 2 | 4 |
| Muzzleloading | Oct. 6-Oct. 11 (*Eastern)<br>Oct. 6-Oct. 11 (Western)<br>Nov. 10-Nov. 15 (*Central)<br>Nov. 17-Nov. 22 (Northwestern) | | | |
| Gun | Oct. 13-Jan. 1 (*Eastern)<br>Nov. 17-Jan. 1 (*Central)<br>Nov. 24-Dec. 6 (*Northwestern)<br>Nov. 24-Dec. 13 (*Western) | | | |
| Gun Either Sex and Special Either Sex | See *1986-87 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* | | | |
| Black Bear | ***Oct.13-Nov. 22 and Dec. 15-Jan. 1 | 1 | 1 | 1 |

| | | | | |
|---|---|---|---|---|
| | Nov. 15-Jan. 1<br>***Dec. 8-Jan. 1<br>***Nov. 10-Nov. 15 | | | |
| Wild Boar | Oct. 13-Nov. 22 and<br>Dec. 15-Jan. 1 | 1 | 1 | 2 |
| Gray Squirrel | Oct. 13-Jan. 31 | *****8 | 16 | 75 |
| Fox Squirrel | Oct. 13-Dec. 31<br>(Only in 18 counties. Season closed elsewhere. See *Regulations Digest*) | *****1 | 2 | 10 |
| Quail | Nov. 22-Feb. 28 | 10 | 20 | None |
| Ruffed Grouse | Oct. 13-Feb. 28 | 3 | 6 | 30 |
| Raccoon and Opossum | ***Oct. 13 (sunrise)-Jan. 31<br>***Oct. 20 (sunrise)-Feb. 28 | No restriction on opossum.<br>See *Regulations Digest* for bag limits on raccoon. | | |
| Rabbit | Nov. 22-Feb. 28 | 5 | 10 | 75 |
| Rabbit - Box Trapping | Oct. 1-March 31 | | | |
| Pheasant - Nonnative Male Pheasant Only | Nov. 22-Feb. 1 | 3 | 6 | 30 |
| Woodcock | Nov. 22-Jan. 5 | 3 | 6 | None |
| Bobcat | ***Dec. 15-Jan. 31<br>***Dec. 15-Feb. 15 | No restriction | | |
| Fox | See *Regulations Digest* | | | |
| Groundhog | No closed season or bag limits. | | | |
| Wild Turkey Bearded Turkey Only | ***April 11-May 9 | 1 | 2 | 2 |
| Migratory Game Birds | Unavailable at this time; Federal regulations may be obtained by contacting license agent or writing N.C. Wildlife Resources Commission after October 1, 1986 | | | |

*See map on last page of this pull-out section for approximate boundaries of Eastern, Central, Northwestern and Western deer seasons; see *1986-87 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest* for complete details. For a copy of the *Digest*, write: N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27611.

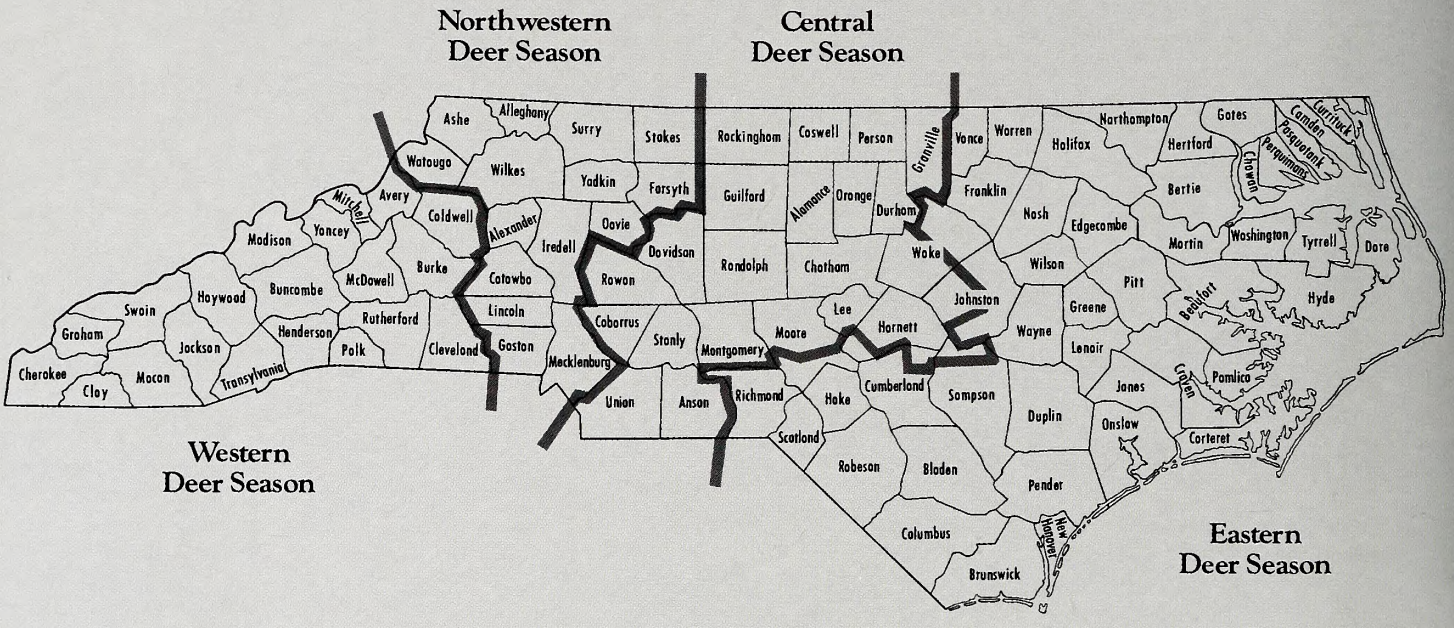
**Some areas of Western season the daily limit is 1, possession 2 and season 2.

***Season and bag limits vary from location to location; see *1986-87 Regulations Digest*.

****Eastern limit is 5 deer of which one must be an antlerless deer taken during an established either-sex season.

*****Total limit of 8 squirrels per day of which one can be a fox squirrel.

# Boundaries for North Carolina Deer Seasons




North Carolinians are blessed with good hunting. Deer, black bear, wild boar and wild turkey are all found here, and are considered big game. There is also excellent hunting for squirrel, rabbit, quail, dove and grouse.

**Licenses**. The first thing any hunter needs is a license, and the best buy for the all-around outdoorsman is the sportsman's license. This license includes all appropriate permits for hunting big and small game and fishing. For those who hunt only small game, a statewide hunting license may suffice. However, permits for big game hunting and primitive weapons must be bought separately.

Perhaps the best option for the serious outdoorsman is to buy a lifetime license. Five of these lifetime licenses are available—including the sportsman's license for adults, youths and infants, and lifetime hunting and fishing licenses. The sale of these licenses supports the Wildlife Endowment Fund, with only the annual interest being used for wildlife conservation. Eventually, the fund will play a major role in supporting wildlife conservation in North Carolina. Licenses are available from license agents across the state, and information on lifetime licenses is available from license agents, Wildlife Commission employees, or by writing the N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

**Game Lands**. Finding a place to hunt is generally no problem. North Carolina has over 2 million acres of public hunting areas enrolled in its game-lands system. For the price of a game-lands use permit (which is included in the sportsman's license), sportsmen can hunt or fish on these public lands. Game lands are located throughout the state, and information is available free by writing: Game Lands Maps, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

**Tagging Big Game**. Big-game hunters should also be sure to tag and report all kills. Big game—which includes deer, black bear, wild turkey, and wild boar—must immediately be visibly tagged at the scene of the kill. These tags are provided when hunters purchase big-game permits or sportsman's licenses. Then, the hunter must report the kill to a nearby wildlife cooperator agent. There are over 1,500 wildlife cooperator agents located throughout the state—look for their diamond-shaped signs at country stores, sporting goods stores and other busi The cooperator agent will fill out a big-game kill report. A duplicate of this card is given to the hunter, and serves as a permit to possess the animal. Later, information from the big-game kill reports is used to determine harvests and other trends. Copies of the annual big-game harvest reports are available by writing to the Division of Wildlife Management, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

**Hotline**. Wildlife belongs to everyone, and if you observe people breaking wildlife regulations in the field, call the Wildlife Commission's toll-free Wildlife Watch Hotline at 1-800-662-7137.

**Y-shaped organ** *called the* osmaterium *exudes unpleasant scent which may protect this tiger swallowtail caterpillar* (Papilio glaucus) *from predators. The organ is normally retracted, exposed only when the caterpillar is startled.*

# *Could A Caterpillar Be Beautiful?*

*Not all caterpillars are nondescript crawlers waiting for a stunning metamorphosis. Some are handsome enough already, thank you.*

*written and photographed by Kerry Givens*

One of the great Unwritten Laws of Nature states that all humans are suckers for baby animals. In fact, the uglier the parent happens to be, the cuter its babies seem to us (wild pigs come to mind). One large group of creatures provides an exception to this law, however —the Lepidoptera. The adult forms of butterflies and moths have long captivated humans. Since the dawn of time (or at least since the invention of the butterfly net), generations of eager naturalists have captured millions of these insects, squashed them under glass mounts and worshipped them as they quietly collected dust. But few people seem quite as excited by the babies of butterflies and moths, namely their caterpillars.

Judging from the looks most folks offer me when I reveal my obsession with caterpillars, I'd say it's time these maligned creatures got a new press agent. Unfortunately, a few particularly nasty species have made things bad for caterpillars of all types. No hunter grins tolerantly when he finds his favorite hunting garb perforated by larva of the clothes moth. The tomato hornworm is notorious for the grief it has caused many a home tomato gardener. And the caterpillar of the wax moth, with its penchant for beeswax, is the scourge of beekeepers. It can literally eat a hive's occupants out of house and comb.

I maintain that most caterpillars are not only harmless, but also fascinating in their own right. In fact, I find many caterpillars to be much more interesting than the butterflies or moths that they eventually turn into. Certainly they're much easier to approach than their winged counterparts. Some of the most frustrating moments in any nature photographer's life are spent on hands and knees creeping after timid butterflies. Without fail, as the camera is raised for the photo, the insect hurtles off in seeming

# *Could A Caterpillar Be Beautiful?*

***Parasitic wasps or flies** sometimes lay eggs on the backs of caterpillars. The eggs hatch and the larvae enter the body of the host, feeding on the living tissue. This spiny oak slug caterpillar* (Euclea delphinii) *bristles with tiny parasitic cocoons.*

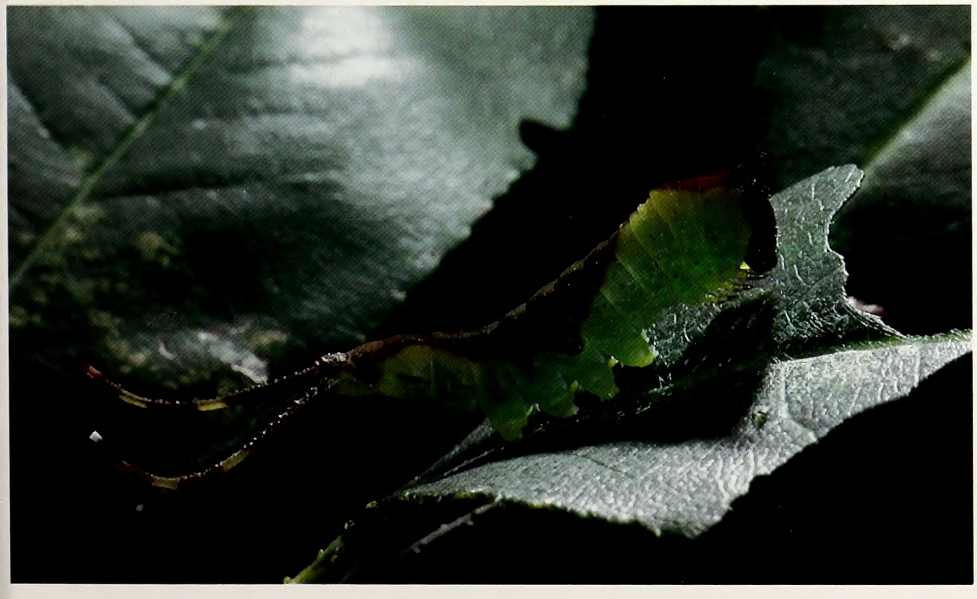
mockery. And few creatures fly quite as fast as a butterfly with a swearing photographer in pursuit. Such tribulations are unknown to the caterpillar-watcher. Since most larva spend days to weeks on a single food plant, many repeat visits can be made. Such opportunities are nonexistent with butterflies and moths. Futhermore, many caterpillars become more brightly-colored as they grow. Butterflies and moths just tend to get more tattered and bedraggled, in contrast.

I am continually amazed at the terrific diversity of shapes and colors that caterpillars come packaged in. They can be shiny and smooth or bristly and hairy. The larva of the common puss moth, for instance, is buried under a toupee-like mat of hair so dense that even its head is invisible. A few caterpillars sport stinging spines. One of these, the saddleback caterpillar, is found throughout the state, on many different types of plants. With its antennae-like tubercles and false eyespots, it is one of the most bizarre yet handsome caterpillars around. I can boast of having survived its sting, thanks to my careless handling of one during a photography session (I prefer to depict the event as an example of bold experimentation so typical of today's rugged young naturalists). It was no different from a brush with stinging nettles.

Spines may deter a bird looking for an easy meal, but they are useless against a much tinier foe—parasitic wasps and flies. I often encounter caterpillars whose backs bristle with tiny silken cocoons of these insects. This is a sign of impending demise for the hapless caterpillar, because the parasites mortally wound their host by devouring its viscera from within. Only then do they emerge, sometimes by the score, to spin their cocoons on the back of the dying host.

***Mock "snake eyes"** of spicebush swallowtail larva* (Papilio troilus) *may deter would-be predators. Caterpillar's real eyes are concealed beneath the head in this photo. Colorful caterpillar was photographed after its fifth moult.*

**Toupee-like** *mat of hair covers the puss moth caterpillar* (Megalopyga opercularis). *Caterpillars take an astonishing variety of forms and colors, adaptations that help the larvae live long enough to achieve flight as a butterfly.*



***Larva of black-etched*** *prominent moth* (Cerura scitiscripta) *shows its Y-shaped* osmaterium, *whose unpleasant scent may thwart predators. The life histories of many caterpillars are mysterious, offering puzzles for the curious backyard naturalist to solve.*

# *Could A Caterpillar Be Beautiful?*

***Caterpillars feed** on leaves by chewing from the outside of the leaf to the mid-vein. The right leaf shows typical caterpillar damage, while leaf on left has been chewed by another kind of insect.*

Parasitized caterpillars are common. If you spend enough time watching larvae, eventually you'll witness a parasitic wasp or fly laying its eggs on an unlucky host. Some caterpillars don't seem to notice, but many appear rather perturbed by the attack. I have seen caterpillars try to thwart oviposition by thrashing back and forth. When harassed, larvae of swallowtail butterflies and some moths extrude brightly colored, malodorous structures called osmeteria—these are believed to repel would-be parasites. Some tropical caterpillars have gone one step further: their bodies are covered with sundew-like bristles that act like flypaper, capturing any parasitic fly looking for a landing pad.

Pick up any contemporary field guide on butterflies or moths. You'll find very little space devoted to illustrations or discussion of the larvae of these insects. In fact, the life histories of many caterpillars are virtually unknown. Many beginning caterpillar-watchers are surprised to witness the often dramatic changes in color and shape a larva may undergo as it grows. The spicebush swallowtail, a very common caterpillar in North Carolina, looks remarkably like a bird dropping in its early days of life. But it will grow, shed its skin several times and ultimately transform into a magnificent, blue-spotted creature with astounding mock snake-eyes.

Caterpillar observation is one of the great untouched vistas in natural history. Even common species of caterpillars have a great

## Caterpillar-finding Tips

**Where to hunt:** Butterflies and moths tend to select flight paths that avoid dense vegetation (with a few notable exceptions, such as thicket-loving satyr butterflies). In other words, they tend to take a path of least resistance. So expect a concentrated amount of butterfly and moth activity along wide, open trails bordered by thick woods. The wider the trail, the better; footpaths are generally not as productive as jeep trails or edges of powerline cuts.

**When to hunt:** Conceivably, caterpillars can be found any month of the year, since a few species even hibernate in larval form over the winter. However, the best hunting is to be had during the warmer months, especially early autumn —September and October. Many caterpillars continue to feed right up to the first cold spell. Hence, in fall, many caterpillars are at their maximum size and are easier to spot. And the longer a caterpillar has been feeding on the same plant, the more leaves it will have eaten, making its presence even more detectable.

**Which plants to look on:** Caterpillars may wander off the foodplant when not feeding, so may turn up on virtually any species of plant, even poison ivy. However, most of the time you will find them on the foodplant itself. Some plants seem distinctly more popular as caterpillar food plants than others. I have found many types of larvae on saplings of oaks, maples, tulip poplar, sassafrass, and wild cherry. In contrast, I do not find many caterpillars on sweetgum, redbud, or evergreens.

In general, the more isolated the food plant is from surrounding vegetation, the more likely it is to be "noticed" by passing butterflies and moths looking for a place to lay their eggs. On one occasion I found about 15 larvae, of four different butterflies and moths, feeding on a lone sassafrass in the middle of an open field. I call this the "oasis effect."

**What to look for:** The best clue to a caterpillar's presence is chewed leaves. Many non-caterpillar insects such as beetles and grasshoppers also chew leaves, but caterpillars have a characteristic style of eating—look for leaves that have been chewed from one edge the whole way into the midvein (photo). Noncaterpillar leaf-eaters seem to chew more indiscriminately, leaving behind erratic, scalloped edges of unchewed leaf.

If you are diligent, you may spot pellet-like caterpillar droppings, or frass, resting on leaves or beneath the food plant—usually a sign of very recent feeding. Depending on the size of the caterpillar, the frass will range in size from smaller than a BB to larger than a pencil eraser. Usually it is black, but it may be olive or brown. Once I found some unusually large frass in the middle of a trail, far from any particular food plant. Scanning overhead with binoculars, I located the source: a hot-dog-sized caterpillar of the beautiful imperial moth, feeding high in the branches of a pine.

Some caterpillars build characteristic leaf shelters on the food plant. The red admiral butterfly caterpillar webs together the leaves of stinging nettle, an effective deterrent to everything except gloved caterpillar watchers. The silver-spotted skipper has a striking caterpillar that is easily found in its rather flat leaf shelter on locust trees. The stunning larva of the spicebush swallowtail butterfly is also readily located if you can recognize its shelter, on sassafrass or spicebush. It is formed from a single leaf folded over upon itself, and always with the bottom of the leaf on the outside. As the caterpillar grows, it makes a series of progressively larger shelters. You may have to examine several shelters (they open up with ease) before you find the one containing the caterpillar. Small spiders often take over the vacated shelters.

If you learn to recognize butterfly and moth eggs, this offers still another route to locate caterpillars. Eggs of the red-spotted purple butterfly are very easy to find in my neighborhood. They are always laid singly on the upper surface of wild cherry leaves, right at the very tip. The eggs hatch within a week, and the newly emerged larva will feed on the very same leaf for several days. Eventually it makes a tiny, cylindrical shelter—rather difficult to spot—in which it spends the winter as a hibernating caterpillar. It then resumes feeding in the spring.

***The spiny oak*** *slug caterpillar* (Euclea delphinii) *is protected by stinging spines. The colors of caterpillars and their diversity make them a delightful subject for study.*

deal to offer a sympathetic observer. Take the pesky tent caterpillar. Only recently, a sharp-eyed ecologist noted that wild cherry, the foodplant of that species, defends itself against the hungry caterpillars in an elegant fashion. The leaves of the plant have tiny glandular structures that release nectar in the spring. This nectar attracts large numbers of ants. The same ants will kill any young tent caterpillars they encounter while they are collecting this nectar. How do the ants lose their ability to kill the caterpillars as the season progresses and the caterpillars become too large to be carried off? The surprising observation is that wild cherry stops producing nectar at just about the same time that the caterpillars are becoming too big for the ants. In other words, the plant is using its nectar as payment for its hit men, the ants. And it stops paying them when they can no longer carry out their duty to the plant.

***Good protection*** *from aggression are the hairy spines of this saddleback caterpillar* (Sibine stimulea). *The eyespots and antennae-like protuberances also confuse predators.*

A degree in ecology is not necessary to enjoy the huge variety of caterpillars in this state. Nor is a large tract of undisturbed habitat required. Almost any forest trail should do. I have done most of my larvae hunting on a trail frequented by hordes of joggers, birders, and picnickers. And yet, each time I find a caterpillar, I can be confident that I'm probably the first human to lay eyes on the animal. It gives me a quiet feeling of pride, even if I have to put up with a few questioning looks from passers-by. ⊠

# The Adaptable WHITETAIL

## Deer have adapted their habits for survival in many interesting ways. Knowing some of these may help you bag one this season.

written and photographed by William S. Lea

I'll never forget that crisp November morning when I first spotted the big chestnut buck. He suddenly appeared some 50 feet from where I hid in my photographic blind. It seemed too good to be true. Several steps brought him directly in front of a downed pitch pine. The nine-point buck deliberately lowered his head and began to rub an antler along one of the branches. I could see the muscles in his powerful legs tighten as he exerted pressure against the opposing limb. Pop! Another limb broke. Soon, his heavy antlers were swinging back and forth with intensifying rage. The snapping of limbs sounded like a series of firecrackers exploding. Suddenly, he stopped and all was quiet. The buck arrogantly viewed the shambles he had wrought and let out a grunt of contentment.

I continued watching as he took a few more steps and began pawing the ground. Gradually, he lifted his head toward the overhanging branches of a small hemlock tree. Then, much to my amazement, the buck stood up on his hind legs in order to gently rub his antlers on the evergreen boughs. He finished by positioning his back legs together and urinating over the bare soil he had previously scraped clean.

What a thrill it was to witness such an incredible ritual. I did not understand the significance of what I had just observed, but at that precise moment I decided that the whitetail deer was one wildlife subject worth further investigation. Following months of study I began to realize that what I had observed was only one aspect of a complex system of adaptive strategies used by the white-tailed deer to survive. And survive it has—to the point where many wildlife biologists believe there are more whitetails in existence today than at any other time in history.

Actually, this deer's innate survival tactics become apparent at the very beginning of life. A new-born fawn can take its first steps within 30 minutes after birth. The odors associated with the birthing site may attract predators. Thus, the doe will lead her young to a new location after licking her fawn clean. For the first few days, the young deer will remain nearly odorless.

As its primary defense, the fawn must remain undetected. White spots provide the fawn with camouflage protection. Instinctively, it stays perfectly motionless, even if a predator approaches. As those of us who spend a lot of time in the woods know, a fawn must literally be stepped upon before it will move.

By seven to 10 days of age, the young deer's strength and coordination have developed significantly. Increasing speed

***White-tailed deer** communicate using visual, vocal, and chemical signals. In the photo on facing page, the deer's tarsal glands, located on its hind legs, secrete a scent that indicates the buck's social dominance and availability, helping it locate a mate. In near photo, the deer communicates alarm by flagging, or raising its tail and revealing the white underparts.*

***A new-born fawn*** *(right) has virtually no scent, and the white spots provide effective camouflage. Combined with the ability to remain perfectly still, these help prevent the fawn from being discovered by predators.*

***Rutting bucks*** *often show signs of aggression, as does the eight-pointer below. The lower hindquarters and erect hairs on the back are signs that the buck is challenging another buck nearby. Aggressive bucks will approach their rival by walking nearly sideways. After these signals are communicated, a brief fight often ensues.*

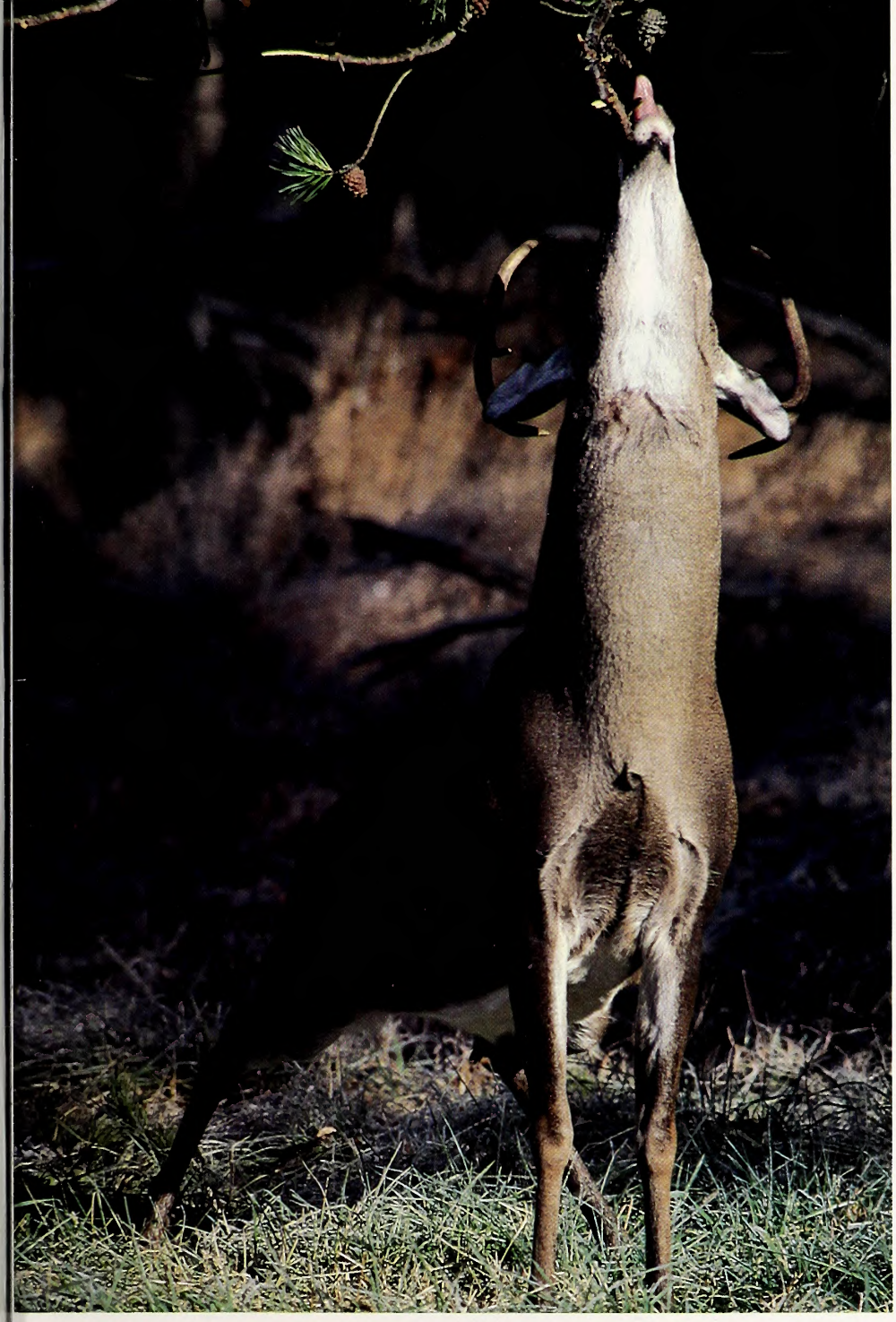
and agility provide the fawn with a new alternative in evading predators.

The deer's digestive system and feeding habits combine to form another important adaptive strategy. The whitetail is most susceptible to predation when feeding. Thus, it is crucial that they reduce this time of vulnerability to the greatest extent possible. The white-tailed deer has done just that. Deer are ruminants, also known as cud-chewers. They possess a four-chambered stomach. This enables them to gather and swallow large quantities of food in a short period of time. Once the food has been collected, the deer seeks protective cover. After bedding down in a safe place, golfball-sized bits of food are regurgitated and chewed at leisure.

Another inherent skill contributing to the whitetail's survival success is its ability to communicate. Unable to speak as we humans do, deer must rely upon vocal, visual, and chemical methods of relaying messages.

One of the most familiar forms of vocalized communication is the "snort." A deer will suddenly force a significant volume of air through its nostrals causing a startling sound that serves as a warning to other deer. Another example of vocalized communication is the mournful bleating of a small fawn in search of its mother. And a buck looking for a doe in estrus will approach many deer with a series of short, deep grunts. All of these sounds, although difficult to describe, are quite distinctive and have significant meanings.

Used quite commonly, visual forms of communication can express messages as clearly as our written word. For instance, before two bucks clash, they will convey warnings and aggressions in a variety of ways. The aggressor will lay his ears back flat, lower his head, and walk nearly sideways toward his adversary. The opposing buck may retreat or respond in a similar fashion. Often a buck will lower his hind quarters and erect his hairs like those on the



***A four-chambered** stomach allows deer to consume large amounts of browse quickly. Then, the food is regurgitated and chewed at leisure in the safety of cover, reducing exposure to predators.*

back of a growling dog, an attempt by the buck to appear bigger and more ferocious. Only after most or all of these visual warnings have been exhausted will a fight actually ensue. Most battles last only a few moments as one buck quickly realizes he is no match for the other and beats a retreat with the victor pursuing egotistically for others to see.

The most commonly observed form of visual communication used by the deer is "flagging," or raising the tail. The sudden display of the deer's white tail hairs relays a visual warning to others. In the absence of immediate danger, an alert look and the simple flaring of the tail hairs provides a more subtle warning.

The most complex and least understood method of deer communication involves the production and transmission of chemical scents. Biologists are devoting a great deal of study to this subject to answer many puzzling questions. Deer definitely use scent producing glands to communicate, but the messages are difficult for humans to interpret.

For example, the buck I observed standing on his hind feet and rubbing his antlers on the overhanging branch was actually transmitting a chemical message with scent-producing glands located at the base of the antlers on the forehead. It is believed that these glands are used in marking territory or, at least, in advertising the buck's presence.

While photographing deer, I have observed bucks rub the base of their antlers and forehead on small saplings. Often, the antlers will remove strips of bark, resulting in a visual sign. Occasionally, the whitetail will lick this area. Some scientists have suggested that the tongue may also transmit chemical messages.

The tarsal glands, located on the inside of the back legs, about half-way up, play a very important role. One hypothesis states that deer recognize each other on the basis of the chemical scent produced by this gland. Scents emitted from the tarsal gland cling to the surrounding hairs. Different scents provide different messages. During moments of danger, the hairs surrounding the gland become erect and are thought to transmit a warning signal to other deer.

The tarsal gland also has a variety of functions during the mating season. Its secretions are thought to communicate a deer's social dominance. The scrape a buck produces also utilizes this gland. When the whitetail I was observing urinated on his scrape, he was transmitting the scent produced by the tarsal glands, thus advertising his presence to any doe that happened along.

Other scent glands also exist. The purpose of the metatarsal gland located midway between the hoof and the tarsal gland is not well understood. The interdigital gland found between the two lobes of the hoof plays a role in a doe's ability to locate her fawn. The preorbital gland next to the deer's eyes secretes a waxy substance that scientists believe to be also used in scent marking. The study of chemical communication among deer is in its infancy.

As can be seen, the white-tailed deer certainly possesses many successful adaptive strategies. One scientist's research has shown them to be the most genetically variable large mammal in existence, but I like to think of the whitetail as just plain smart. Needless to say, it's not only its intelligence that causes so many of us to have an unquenchable love for this species. Adaptability, swiftness, and beauty all play key roles in winning our respect and admiration. But most of all, it is our personal encounter with the whitetail in its environment that provides us with an unforgettable insight into the true wonder of this magnificent creature. ⊠

*Cullowhee Beagles Among Best*

## New Field Trials Test How Well Dogs Hunt

*Written and Edited by Mark Taylor*

The April sun was just beginning to color the eastern sky as we gathered underneath the big cook tent and began dishing up mounds of scrambled eggs, spicy sausage, country ham, fluffy biscuits, grits, and gravy. I added a large mug of steaming coffee and went out to the tables to eat. It was the kind of breakfast people eat when they have work to do. Clarence Pressley of Cullowhee, my host for the day, said he tells people how tough field trials can be when you follow a pack of bawling beagles all day through overgrown fields and woodlands. Then he added with a wink, "It's so much fun though, that I don't even notice how tired I am until it's all over."

JAY DAVIES

***Dogs To Be Proud Of:*** *Some of the best hunting beagles in the country are owned by the Pressley family of Cullowhee. From left to right are Clarence Pressley with Smoky Mountain Lady, Ray Pressley with Meadow Lark Queen, and Mike Pressley with Short Pacer, 1983 champion in the United Beagle Gundog Field Trial Association.*

Clarence, his father Cling, brother Ray, and son Mike are charter members in the 45-member Tuckaseigee Beagle Gundog Club, which was sponsoring the field trial on 325 acres of land the club leases near Bryson City. Since acquiring the lease over a year ago, the club has made several improvements. They planted special wildlife seed mixtures supplied by the Wildlife Commission and consulted with District 9 Wildlife Biologist Joffrey Brooks of Waynesville about managing the land for small game. "We followed Joffrey's advice," said Clarence, "and the place looks great."

The two-day trial would be one of several regional events held during the year to qualify dogs for competition in the National Beagle Gundog Runoff Trials held in the fall at Berea, Kentucky. Over 100 dogs were entered in the day's event, coming from Tennessee, Georgia, and North and South Carolina. The dogs sported names like Sanderstown Millie, Walnut Cove Brea, Bennett's Scarlet, and Swamp Bottom Josie.

Gundog Field Trials originated in 1977 when a splinter group of what was then called American Kennel Club "Brace Hunts" became dissatisfied with the type of dog winning the competition and formed the United Beagle Gundog Field Trial (UBGF). Today, the movement counts nearly 40 clubs, which are scattered across the nation from Wisconsin to Mississippi.

In a UBGF field trial dogs are judged on the bench for conformation to breed standards and in the field where their ability to hunt rabbits is tested under hunting conditions. The only difference between field trial competition and actual hunting is the rabbits are not killed. The judges grade each dog on its ability to jump and run rabbits. If a dog loses the scent, doesn't "give voice," or is reluctant to leave its handler's side and hunt, it is downgraded or eliminated.

Gundog field trials are continuing to grow in popularity, and with the added interest the price of dogs has risen. Today, puppies from quality breeders usually sell between $150 and $1,500 and trained dogs may cost $10,000.

If this type of sport appeals to you, you are invited to join one of several clubs spread across North Carolina. A listing of the clubs is available from Clarence Pressley, P. O. Box 21, Cullowhee, N. C. 28723.

Oh, and one other thing. If you decide to get involved with gundog field trials, buy yourself a pair of heavy chaps. You'll need them to turn the greenbriers as you follow the dogs. Whoever said this sport wasn't work was pulling your leg.

*—Jay Davies*

## Granville Yields Record Deer

REX GARY SCHMIDT

***One For The Books:*** *The first Boone and Crockett Record deer shot in North Carolina was displayed at the Dixie Deer Classic. The deer scored 172½ points on the Boone and Crockett scale, and was shot by Dudley Barnes of Granville County. Of the 154 heads entered, the mount took Best In Show, Best North Carolina Entry, and Best by Popular Vote. From left to right are Danny Allen, Dudley Barnes, and a spectator.*

## Fishing Voted Favorite Sport

Baseball may be the all-American sport, but fishing ranks right up there near the top as America's favorite pastime. In fact, the Gallup Poll's 1985 leisure activities audit found that fishing is the second favorite recreational activity among American adults. Only swimming exceeded fishing.

The poll found that 34 percent of American adults had gone fishing at least once in 1985. Fishing was the single most popular activity among American men (44 percent participated) and fifth among women (24 percent).

*Kerr Scott Reservoir Has Good Supply*

## Record Spotted Bass Waiting For Anglers

Almost every angler dreams of catching a record fish. You could fish for a lifetime without coming close to cracking the record for such sought-after species as largemouth bass or any of the trouts. Trying to set a new record for some of the less popular species, however, is a feasible goal.

Right now, the best bet for setting a new state record probably lies with spotted bass. The current record of 14.5 ounces was taken from Hiwassee Reservoir, and these fish are native to the streams in the Hiwassee River drainage. There are bigger fish, however, in W. Kerr Scott Reservoir near Wilkesboro.

"We recently conducted electro-fishing surveys on W. Scott Reservoir to sample the spotted bass population." said Joe Mickey, Wildlife Commission fisheries biologist for District 7. "We found spotted bass were up to 16½ inches long and weighed up to 2½ pounds."

Spotted bass were introduced to W. Kerr Scott Reservoir between 1977 and 1979. The Wildlife Commission stocked a total of 13,000 fingerlings during that time.

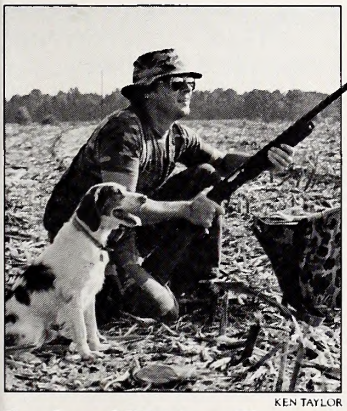
"Smallmouth bass had never done much in this reservoir and the largemouth bass population was only fair," Mickey added. "However, the habitat for spotted bass was good. Our recent surveys showed that spotted bass are now well-established in the reservoir, and a record fish may very well await some lucky angler."

Spotted bass look very much like largemouth bass, and information on identifying them is found in the 1986-87 N. C. Regulations Digest. In addition, spotted bass generally have a small patch of light brown teeth (similar to rough sandpaper) on the backs of their tongues.

"Fishing for spotted bass is very similar to fishing for largemouth," said Mickey. "You use the same lures and techniques, and the fish are found in the same areas. In general, though, spotted bass seem to prefer slightly deeper water. Deep water off rocky points, along rip-rap, and near bridges are all good places to fish."

*Weather Plays Big Role*

## Outlook Good For Dove Season



KEN TAYLOR

***Ready and Waiting:*** *Thousands of sportsmen will take to the field when dove season opens, and biologists say that about 27 million doves are usually found in North Carolina on opening day.*

September means doves to North Carolina hunters, and the outlook for this season is good. Weather conditions, however, can make a big difference between a successful opening day and a bust.

"Weather fronts have a big influence on dove movements," said Carl Betsill, Wildlife Commission program coordinator for migratory birds and small game. "The first cold fronts usually come through the state in late August or early September. Most of the doves found then are juvenile birds which gather in big flocks, and they seem to wait for a change in the weather before they move. If a cold front comes through, these flocks often move south or scatter. They can be in a field one day and gone the next."

Good dove hunting is found on many private lands where the birds are attracted to freshly cut crops of corn, sunflowers, wheat and other grains. However, the Wildlife Commission also maintains dove fields on such Piedmont game lands as the New Hope, Falls-of-the-Neuse, Butner, Sandhills and Uwharrie game lands. Many other game lands also offer dove hunting, and the names of these areas are listed in the game lands map books which are available from license agents.

*Laurinburg Chapter Contributes*

## Quail Unlimited Helps Wildlife

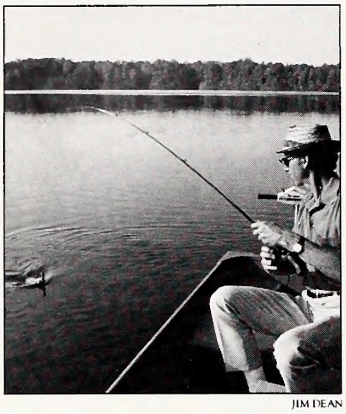
DEBBIE CONGER

***Small Game Gets Big Check:*** *The Carolina Bay Chapter of Quail Unlimited in Laurinburg recently donated $1,003 from the proceeds of its annual banquet to aid the Wildlife Commission's small-game program. "We're very grateful for this contribution," said Jerry Wright, commission chairman, "and it will be a big help to our wildlife programs.*

*From left to right are Quail Unlimited members Fred Potts, Peyton Gentry, Mack Henderson, J. Robert Gordon, and Commission Chairman Jerry Wright.*

*Excise Tax Broadened*

## New Funds Will Improve Sport Fishing



JIM DEAN

***Sound Investments:*** *The excise tax on fishing equipment was recently broadened to include fishing boats, imported tackle, and other items. These funds support the Dingell-Johnson Fund, and will be distributed among the states to improve fishing in fresh and coastal waters, and public access to waters.*

North Carolina fisheries programs will get a welcome shot in the arm from a recent expansion of the Dingell-Johnson Fund. The D-J Fund is supported by an excise tax on fishing equipment, and annual apportions are made to individual states based on their number of licensed fishermen and water areas. The Wallop-Breaux expansion of this fund adds fishing boats, imported fishing equipment, and other items to those covered by the excise tax. Nationally, this new legislation will add approximately $120 million to the coffers of the Dingell-Johnson Fund.

"North Carolina will receive about $1.1 million from the Wallop-Breaux expansion in 1986 in addition to the $500,000 we normally receive from our annual Dingell-Johnson allotment," said Fred Harris, chief of the Boating and Inland Fisheries Division of the Wildlife Commission. The legislation creating the Wallop-Breaux expansion of the fund stipulates that these revenues be used for sport fishing programs in both fresh and salt water since this equipment is purchased by inland and coastal sport fishermen. The Wildlife Commission will receive approximately $700,000 to $800,000 for inland projects and the N. C. Division of Marine Fisheries will receive the remainder."

At least 10 percent of the funds must be used for boating programs. The remainder will be used for fisheries management and research.

"We plan to use the boating funds to improve maintenance at our boating access areas," said Harris. "This is badly needed throughout the state."

Fisheries projects will emphasize habitat improvement. "We have a number of projects planned," said Harris. "In the mountains, for example, we'll improve habitat in some trout streams by installing structures which create additional pools and cover. This will result in better trout fishing. We plan to build fishing piers on some lakes in the Piedmont, and also will build more artificial reefs. One of the projects we have planned for the coast is to clear boat lanes in some of our blackwater streams. These waters offer excellent fishing, but are often so choked with snags and other obstructions that they can't be fished. By removing only enough obstructions to provide boating access the aesthetics and fish habitat in the stream will be preserved while allowing anglers and others to enjoy these waters."

Harris says that some of the funds will be used to evaluate certain fishing regulations, and other research will focus on the effects of habitat-improvement projects on fish populations.

The N. C. Division of Marine Fisheries is receiving about $374,000 from the expansion for marine sport fishing projects.

"We have a number of projects planned," said Mike Street, assistant director for research. "As part of our artificial reef plan, we will be marking all artificial reefs in oceanic and estuarine waters with buoys and will coordinate the construction of new reefs. We also have tagging studies planned for king and spanish mackerel, summer flounder and red drum. Tag returns will give us valuable information on the migrations, growth rates, and utilization of these species. We're also considering developing a marine recreational angler survey, studying of the economic benefits of the various types of saltwater fishing, and improving fishing access."

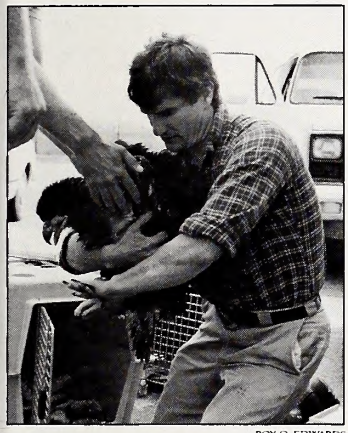
How will this additional funding affect anglers? "The expansion of the Dingell-Johnson fund is the best news that fishermen have had in quite awhile," concluded Harris. "The main goals of many of these projects are to improve habitat for sport fish, and to create additional public access to our waters. Consequently, anglers will see direct benefits from these projects in the near future.

*Help Save Habitat*

## Waterfowl Print Features Geese

***Study In Grace:*** *The 1986 North Carolina Waterfowl Stamp, featuring this painting of a pair of Canada geese by wildlife artist Tom Hirata, is currently available from license agents. Orders will be taken for prints of this stamp by local art dealers through August 31. Funds from the sale of waterfowl stamps and prints helped purchase several tracts of bottomland hardwood forest on the Roanoke River, which provide excellent habitat for waterfowl and other wildlife.*

## Eagles Fly At Mattamuskeet



ROY O. EDWARDS

***Precious Cargo:*** *Keith Cline of The Raptor Center transfers a nine-week old bald eagle from Chesapeake Bay in Virginia for shipment to North Carolina. Three young bald eagles were released at the Lake Mattamuskeet National Wildlife Refuge early this summer as part of a restoration project. These projects are funded by the checkoff for the Nongame and Endangered Wildlife Fund on state income tax returns.*

*Reader Recalls Better Days*

## Pamlico Controversies Offer No Easy Answers

Dear Wildlife:

I have just finished reading the two articles about the Pamlico River in the May issue of *Wildlife in North Carolina*, and I applaud your work. I now live on the Pamlico near Washington, and I grew up on Pantego Creek which empties into the Pungo at Belhaven. In the 1960s, as a teenager, I witnessed the changes in the creek at Belhaven brought about by the influx of fresh water from the drainage of large tracts of land in the Pungo area. Among other things, during the summer you could no longer catch a bucketful of crabs just about anytime you wanted using a chicken neck on a weighted string. The short green algae that used to grow on the rock bulkhead behind our home all but disappeared and the "heldermites" (quick water bugs) that also inhabited the rocks had their numbers greatly reduced. The once plentiful croakers, perch and pinfish dwindled to very few. I never saw eels that were as large as your forearm anymore. I've always been a little sad and a little mad that the changes were made without really thinking about it. An ecology which took thousands of years to evolve was literally wiped out. I think Benjamin Franklin is credited for saying "You don't know the worth of water until the well runs dry." I think a lot of us are beginning to know.

On the other hand, this area for the most part is poor economically and we need industry. This is the paradox. We have traded off water quality for salaries. We don't want to require so much of the industries that they are not profitable. We might all have to move away or live like the Indians did. What we need is everybody working together for clean water and jobs. Technology is at a point where I believe we can have both. If we are willing to invest into the research of that technology now, we can meet our goals. The result could be an abundant ecosystem for generations.

Your articles will make many more people willing to recognize the reality of the decline of our estuaries, and perhaps be willing to participate in doing something about it.

*Benjamin T. Brinson*
*Chocowinity*

## Sportsmen Honored

Tar Heel sportsmen will be honored on Saturday, September 27, proclaimed by Governor James G. Martin as "National Hunting and Fishing Day" in North Carolina. Wildlife clubs across the state will be hosting National Hunting and Fishing Day events. Watch for details in local newspapers.

Governor Martin's proclamation follows:

"More than one million North Carolinians participate in the popular sports of hunting and fishing, traditionally constituting one of the largest groups of citizens concerned about our wildlife resources and the environment we share with these resources.

"Most of the support for sound management and conservation of our wildlife resources is paid for by hunters and fishermen, who have also led the quest for clean air, clean water, and a future for wildlife in North Carolina.

"Now, THEREFORE, I, James G. Martin, Governor of the State of North Carolina, do hereby proclaim September 27, 1986, as 'National Hunting and Fishing Day in North Carolina' and commend this observance to all our citizens."

## The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. Interest is earned through investments made by the State Treasurer's Office. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

**Status on May 31, 1986**

| | Numbers Sold | Revenue Received |
|---|---|---|
| Lifetime Sportsman's License | 17,216 | $5,238,307.28 |
| Lifetime Hunting License | 133 | 26,784.92 |
| Lifetime Fishing License | 1,140 | 203,870.23 |
| Lifetime Subscriptions to Wildlife in N.C. | 726 | 88,412.94 |
| Contributions | — | 72,014.00 |
| Fund Total | | $5,629,389.37 |
| Total Interest Earned | $1,174,723.05 | |

## Calendar Of Events

**September 13-14**
Currituck Wildlife Festival at Currituck High School in Barco. Features wildlife art, carving, displays of traditional decoys, and also includes the North Carolina State Champion Goose and Duck Calling Contest. For more information contact David Heath, Shawboro, N. C. 27973.

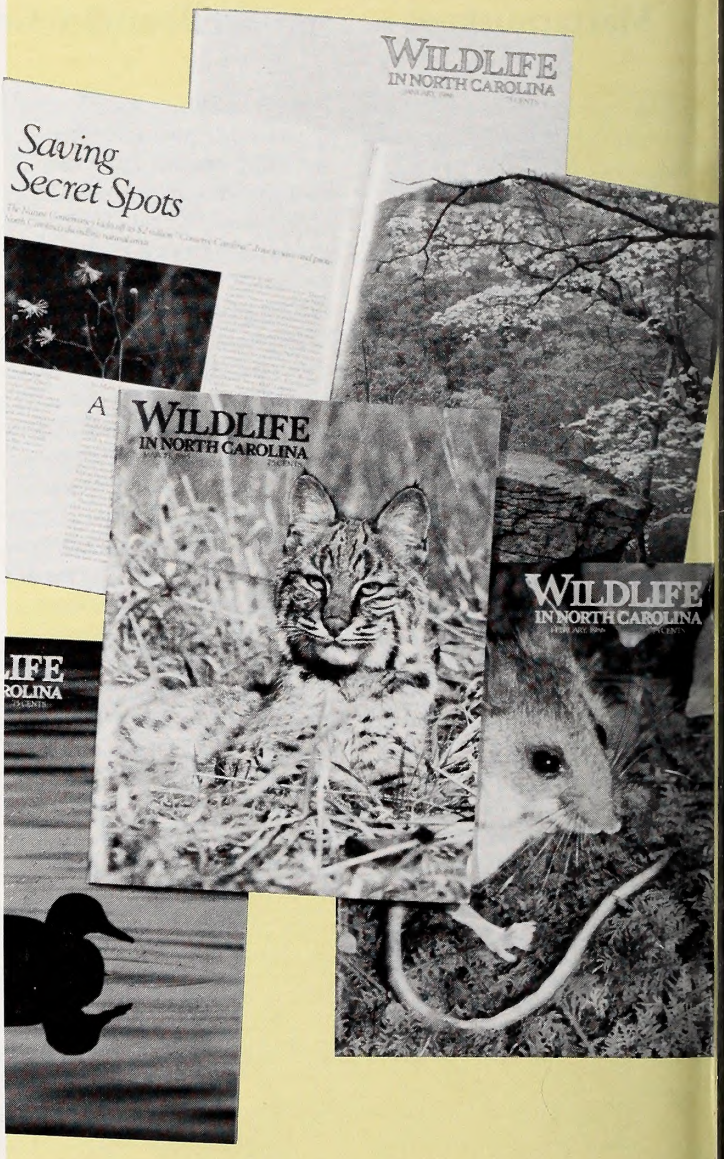
**September 18-21**
Wrightsville Beach King Mackerel Tournament. For more information write P. O. Box 674, Wrightsville Beach, N. C. 28480.

**September 20-21**
American Indian Festival at the Schiele Museum of Natural History in Gastonia. Features displays and demonstrations of Plains and Southeast Indian cultures, dancing, and a planetarium program about Indian star legends.

**September 26-28**
8th annual North Carolina Waterfowl Weekend at Nags Head. For more information contact the Outer Banks Chamber of Commerce, P. O. Box 90, Kitty Hawk, N. C. 27949.

**September 27-28**
North Carolina Trappers Association Annual Rendezvous at the Columbus County Fairgrounds in Whiteville. Features trap-setting contest, displays of trapping equipment, and other events.


# HELP US CELEBRATE...




## The 1987 Wildlife Calendars have arrived.

Larry Barton, Bob Dance, Sallie Middleton, Bob Henley, and Alan Cheek are among the artists featured this year. You will also find information about wildlife, hunting seasons, boating access areas, ferry schedules, and much more.

For art reproductions suitable for framing and information for use throughout the year, order your wildlife calendar today! **(But hurry, last year we sold out!)**

Please send me . . . . . N.C. Wildlife Calendars at $6.00 each $_____
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**For fund raising and bulk rate information (10 calendars or more), call 919-733-4567. Please allow 4-6 weeks for delivery.**

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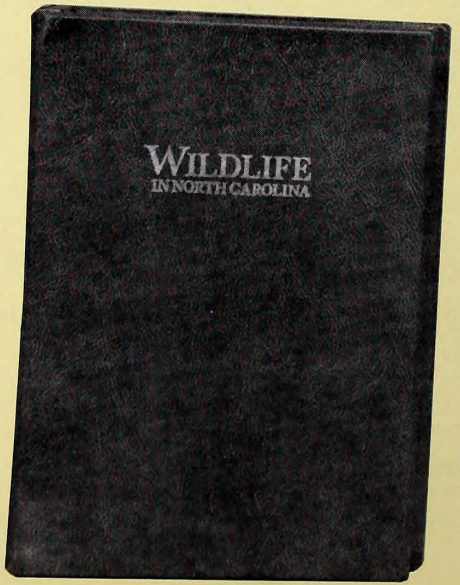

# Now you can charge them!

Lifetime hunting and fishing licenses and lifetime *Wildlife In North Carolina* subscriptions can now be purchased using your MasterCard or VISA. This lets you budget the cost of your lifetime license or subscription in monthly installments. It's a small price to pay for a lifetime of hunting and fishing or a lifetime of reading *Wildlife In North Carolina*.

To order, use the form on the left. This offer may be withdrawn, so please take advantage of it right away.

## Death Stalks The River

The great blue heron is a handsome bird, but the many small minnows speared by this Black River wader would rather not make its acquaintance.

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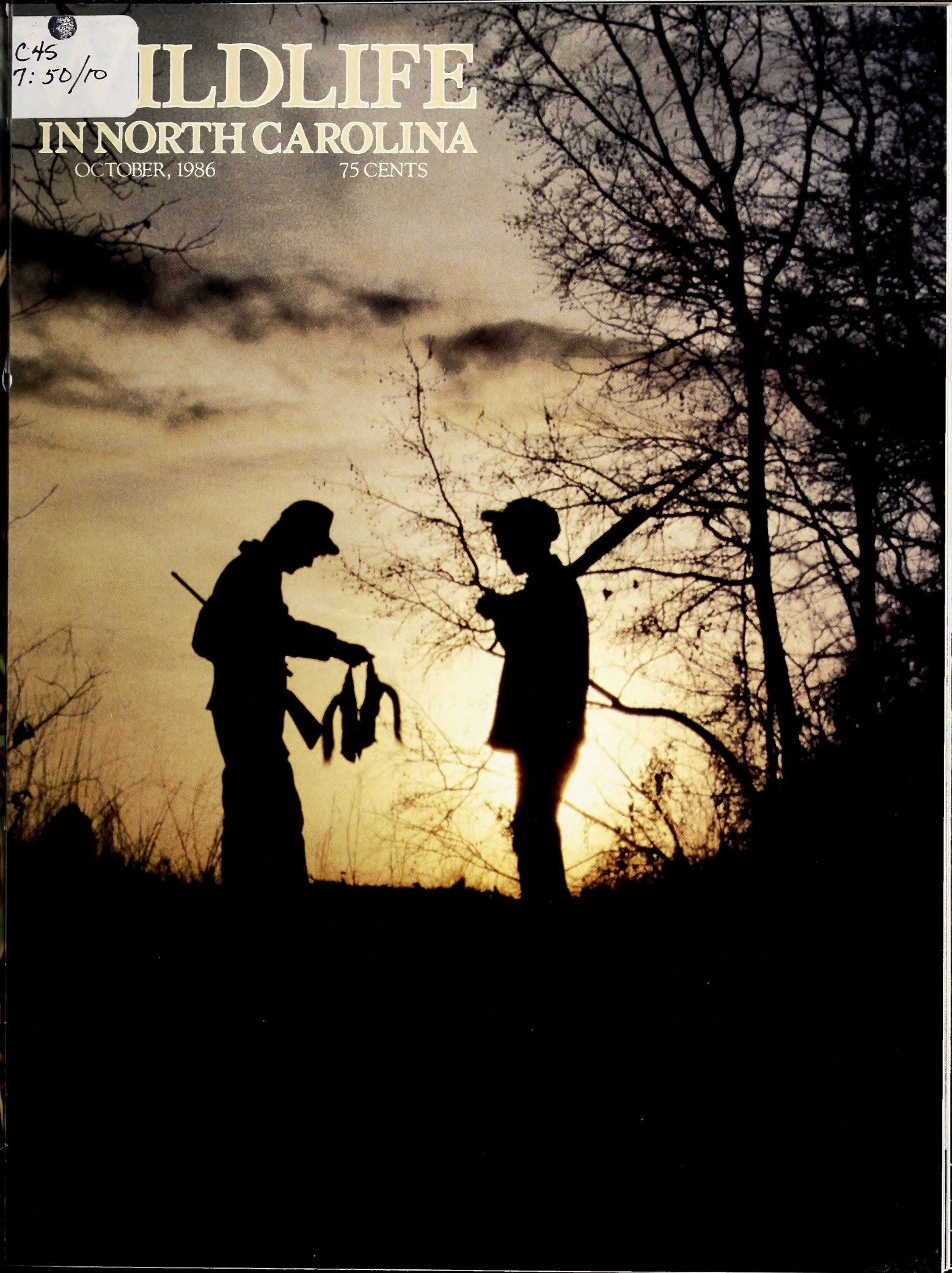

# Pheasants At The Beach

*by Jim Dean*

"I know you're not going to believe this," said the lady on the phone. "We're from the mid-west, and we were down at Hatteras this past week on vacation. While we were driving along N. C. 12, a ring-necked pheasant flew right over the car. I know that's what it was because we've got them on our farm in Kansas. What in the name of Pete would a pheasant be doing at the beach?"

The caller seemed relieved to hear that she was not seeing things, but she was surprised to learn that pheasants are rather common along parts of the Outer Banks. Indeed, the existence of pheasants on the coast is not a well-known fact even among folks who've lived in North Carolina all their lives.

Ring-necked pheasants were brought to this continent from China in 1881 and were first stocked in Oregon. These large gamebirds prospered in their new home, and with natural and subsequent stockings, they became well-established across the nation's northern tier of states. The midwest is famous for its pheasant hunting, and these birds are also very common in parts of New England and other northeastern states, reaching as far south as western Maryland, northern Virginia and Delaware. Indeed, ringnecks are so common that some people have forgotten they came from Asia.

Because these gamebirds have not replaced native birds or caused other adverse ecological impacts, sportsmen and biologists have tried to extend their range into other parts of the nation. North Carolina was no exception, and from 1928 to 1933, nearly 5,000 pheasants were raised and released by the state in hopes that they might prosper. Thousands of others were released by sportsmen's clubs, and some still escape each year from shooting preserves across the state. Yet, despite these efforts, not a single mainland stocking in North Carolina has been successful.

In 1932, however, a group of New York sportsmen released some pheasants near Avon on Hatteras Island, and oddly enough, these birds prospered. In 1942 and again in 1944, more pheasants were released on the Outer Banks. Despite hurricane tides, enough birds survived to establish an isolated, but self-sustaining population far south of their normal range.

"Most biologists believe that the success of these Outer Banks pheasants can be attributed to three things," explains Dennis Luszcz, the N. C. Wildlife Resources Commission's waterfowl biologist. "Necessary minerals in the soil, especially calcium, may be more available on the Outer Banks than on the mainland. Also, predators that might feed on pheasants are not as common on the barrier islands. Finally, although the climate on the mainland may be too hot, it is more favorable on the banks with the constant ocean breeze. Of course, this is partly speculation, and we way never know all the reasons why pheasants have survived on the Outer Banks, but not elsewhere in the state."

In the early 1970s, Commission biologists decided to try an experiment to see if pheasants that had become acclimated to life on the Outer Banks could be trapped and moved inland successfully. A census in 1972 of pheasants at the Pea Island Refuge on Hatteras showed a population of approximately 900 birds, and it was decided that 40 birds could be removed for two successive years without harming the Pea Island population. During the fall and winter of 1972-73, pheasants were released on Pungo Lake National Wildlife Refuge and on Scuppernong Game Lands. Some were also released at Camp Lejeune.

At first, prospects seemed fairly good, and some breeding was noted. Within three years, however, the results took a familiar turn and the pheasants soon disappeared. Biologists now believe that it may not be possible to establish self-sustaining populations of pheasants on the mainland except possibly in limited areas near the sounds or coast where calcium-rich soil and sea-breezes combine to create favorable habitat. Even if pheasants could survive there, they'd have to compete with the rapid spread of recreational home development. At least on Hatteras Island, they can live in a National Seashore.

North Carolina's flirtation with ring-necks didn't end with the 1972-73 attempt to stock them on the mainland. "Sometime in the early 1970s—about the same time we were live-trapping pheasants at Pea Island and releasing them at Pungo and Scuppernong—a group of sportsmen took some pen-raised birds from Kinston over to Core Banks," recalled Carl Betsill, the Wildlife Commission's small-game project leader. "Those birds have become established the same as those on Hatteras."

The ring-necked pheasant's successful introduction into this country is a rather uncommon story because most attempts to relocate wildlife species have created serious problems. Rabbits imported into Australia earlier in this century nearly stripped the continent bare when their numbers multiplied rapidly in the absence of any natural enemies. English settlers in the Northeast held fond memories of the starlings, house sparrows and carp they left behind, and brought them to this country where they are largely regarded as pests that replace more favorable native species. There are countless similar examples worldwide—a dubious legacy of unnatural heritage.

But there have also been a handful of success stories. Few would argue the value of the honeybee, a European transplant. The brown trout—another European—has also found favor here although it may have replaced native brook trout in some waters.

Scientists and biologists are far more cautious today about transplanting various animals, plants and insects, and that's as it should be. Still, the ring-necked pheasant is one immigrant that has found a welcome home.

October, 1986
Volume 50, Number 10

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*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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**Cover** *Two young hunters compare the day's bag of squirrels in this photograph taken at sunset by Gene Hester.*

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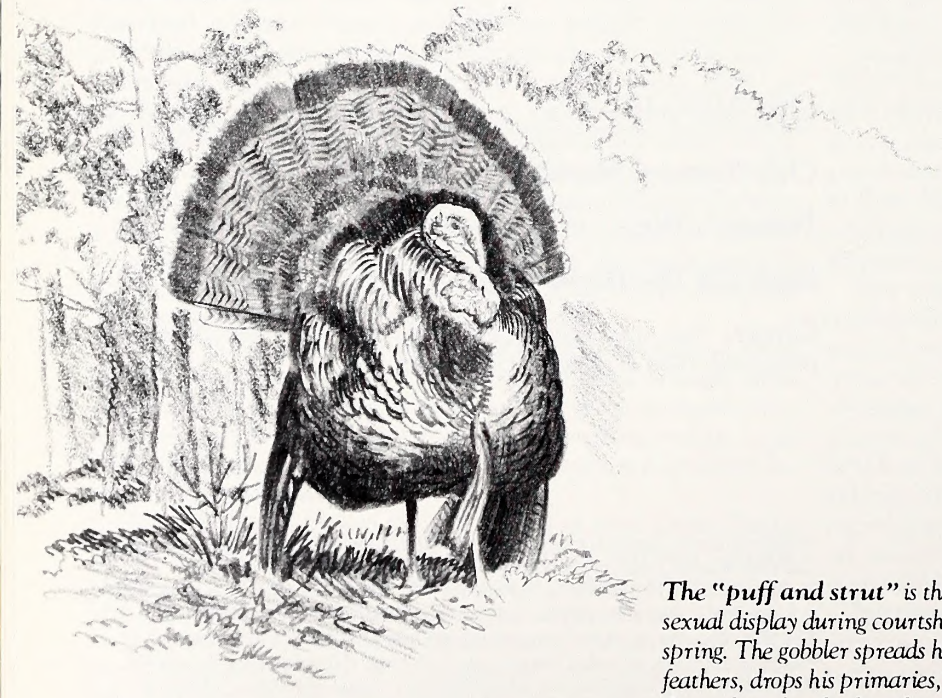
# Dawn Busters

*written by Lawrence S. Earley / illustrated by David Williams*

This is a quiet time of year for the wild turkey. The rigors of spring and summer are over now and both gobblers and hens can concentrate on putting some fat back on their bones. So single-minded was the gobbler in his courting passion last spring that he rarely ate, and for the female the nesting period was stressful and hard. The summer molt, a process that takes up to four months, was a hazardous and energy-depleting time for both male and female even though turkeys never completely lose the ability to fly.

In autumn and early winter, turkeys will gather in large flocks of mixed sexes. They wander through hardwoods looking for acorns and other mast, leaving V-shaped scratch marks in the forest litter. The turkey's gizzard grinds so efficiently that it can reduce a hickory nut to pieces in an hour. The fatty oils of nuts and acorns rapidly put weight on the turkey in fall and early winter. When President Dwight D. Eisenhower shot a 22-pound turkey in 1957, four pounds of the bird were fat. Turkeys grow so fat during this period that reports persisted in the 19th century about gobblers splitting open after being shot and hitting the ground.

Lengthening daylight in late winter will trigger the courting urge, and males and females will separate into different flocks. The gobblers will become more vocal then, breaking the dawn silence with their excited gobbles. As the courting season develops they will strut and puff, fanning out their tail feathers and displaying themselves in all their glory before any and all females.



***The "puff and strut"*** *is the male's sexual display during courtship in spring. The gobbler spreads his tail feathers, drops his primaries, and throws his other feathers forward. So inflated, he struts back and forth seeking to impress whatever female is around. When he lets the air from his lungs, he emits a sound that has been compared to thunder.*

***One of the most curious*** *characteristics of the male turkey, or gobbler, is its ability to change the colors of the fleshy head appendages (wattle, caruncles and snood). In fall and winter, the head is mostly a pale blue, except for the caruncles on the lower neck. But during mating season, the wattles expand and the caruncles change from blue to red in an instant. When frightened, or after death, they resume a light blue hue. The color changes are caused by blood filling and draining these appendages.*

***The beard,*** *a long, hairlike growth on the gobbler's chest, is actually a primitive feather. It is never shed, unlike the turkey's other feathers. This feather is most often associated with males, but females may also grow them. The average male beard is about 8 or 9 inches long.*

***Turkey hens lay*** *their egg clutches on the ground, often in the shelter of a fallen log or at the base of a tree. She lays about 10 to 12 eggs, beginning in April.*

***The map shows*** *the original range of the Eastern turkey (*Meleagris gallapavo silvestris*). There are five other subspecies of the wild turkey inhabiting North America: the Eastern, Florida, Rio Grande, Merriam's, Mexican and Gould's turkeys.*

***Rarely grown by hens,*** *the spur is used in fighting by gobblers. Indians employed the nearly half-inch long spur as an arrowhead.*

# BONUS BUSHYTAILS

## If squirrels are running rampant around your deer stand, maybe it's time you took the hint.

by Terry Shankle

I heard the sound behind me. Faint at first, it had gradually gotten louder until I could hear the individual leaves crackling as the animal's weight forced them down. The animal was working its way closer to me.

A bluejay had raucously announced the approach minutes before, nearly drowning out the sound of acorns falling from a nearby white oak. But now my ears were attuned to the cautious pace of the animal. A few more steps and it would be in view, probably passing on my right. It wasn't the best vantage point because I'm right-handed and would have to turn hard to my right in order to get off a shot.

I checked my weapon one more time. Everything was ready. "Just don't get over anxious," I told myself. "Don't turn around too soon or you'll spook the critter." Tip. . . . . Tip. . . . . Tip. My heart was pumping a little harder now. "Be still! Resist the urge to turn! Wait him out! Use your peripheral vision! Forget the mosquito getting its fill on your thumb!" Mentally I was barking instructions to myself.

Suddenly there was movement on the right, next to the acorn-laden white oak. There!

Dadgummit! Another squirrel. Fooled again. Relaxing the grip on my compound bow and nocked arrow I watched a fat gray squirrel bounce through last year's leaves under the white oak, leaves that, in the last few days and nights, had been pawed over unmercifully by deer in search of the freshly fallen acorns.

It was late October in the Piedmont. The squirrel season had been open only two weeks, but the archery season for deer was into its second month. The falling acorns, cooler weather, and the onset of the rut had increased deer activity, and if you were a deer hunter it was the time to get in the woods and try to put some venison in the freezer.

"Tomorrow I should come back with my .22 instead of this darn bow and get a mess of bushytails for the pot," I told myself. Who was I fooling? I knew full well that when it came time to hunt the next day, I would leave the house with the bow again. After that the blackpowder season would follow and then the regular gun deer season. Suddenly it would be January 31, and the squirrel season would be closed. Another year without a squirrel hunt?

If that thinking sounds familiar, you are one of the reasons squirrel hunting in North Carolina has changed over the last 10 to 15 years. The squirrel, according to North Carolina hunter surveys, has fallen behind the deer as the most sought-after game species in the state. The reason for the squirrels' decline in hunting popularity has nothing to do with a drop in squirrel populations. On the contrary, a few quiet minutes in almost any patch of hardwoods will turn up several squirrels, and many deer hunters complain about the constant distractions caused by too many squirrels!

The biggest reason for the decrease in squirrel hunting is the increased popularity of deer hunting caused by the rapidly expanding deer herds in the state, particularly in the Piedmont. This trend, coupled with a decline in the number of hunters who keep and train rabbit and quail dogs, has caused hunters to change their quarry and hunting habits in the state. Woodlands, especially in the Piedmont, that for decades were traditionally hunted for squirrels, quail, and rabbits, are now abundantly populated with deer. Often hunters can now take deer within walking distance of their house or after just a short drive. Let's admit the obvious. Most hunters would rather bag a deer than a mess of squirrels!

The Wildlife Commission is well aware that squirrel hunting has declined. But that fact has not caused wildlife managers to forget about the animal.

"On the contrary," says Terry Sharpe, the Commission's Small Game Project Leader. "The squirrel figures into most of our management plans. When we select areas for wild turkey-restoration projects, we look for stands of old-growth timber that produce large amounts of nut crops, particularly oaks. What's good habitat for turkeys is also good for squirrels. Our turkey areas usually have abundant squirrel populations. We are constantly advising loggers to leave old-growth trees along stream banks. These provide food as well as travel routes so that squirrels and other game can move between feeding areas and stay concealed from predators."

Sharpe points out that despite the gray squirrel's abundance across the state, some forest-management practices are harmful to the animal's well-being. "People heating with wood who cut dead, dying, or poorly

***For a long time** the gray squirrel was North Carolina's most popular game animal, but it has lost its title to the white-tailed deer in recent years.*

CURTIS WOOTEN

***Hunting with a shotgun*** *(left) is probably the easiest way to bag squirrels for the pot, and several bushytails are enough for a simmering pot of squirrel stew. Squirrel hunting is also an excellent way to introduce youngsters to the sport of hunting.*

shaped trees have forced some tree-nesting animals like squirrels, possums, and raccoons to compete for nest cavities," he said. "They must also compete with cavity-nesting birds as well. Timber stand improvements or thinnings can also cause the same problem. We encourage leaving den trees alone when cutting wood."

Large pine monoculture forests also have a detrimental effect on resident squirrel populations. Sharpe says that leaving strips of hardwoods in large areas being converted from hardwood to pine production would help animals that depend on mast foods. Another good idea is to leave a cross section of mast-producing trees in an area being thinned. Thus if you have a combination of oaks, hickories, maples, walnuts, poplars, and pines you don't leave yourself in a "boom or bust" situation. If one species of tree fails to produce mast, you have others that bloom at different times to take up the slack and provide alternative food sources. "The Wildlife Commission encourages youngsters to hunt squirrels when they first take up hunting," Sharpe says. "It helps them develop their hunting skills on an animal that is wary but not as much so as the deer or wild turkey. And squirrel hunting also provides more opportunity to show results from a hunt, which means a lot to a young hunter. Shooting and missing a squirrel doesn't carry the same stigma as missing a deer. I've never heard of a missed squirrel resulting in the loss of a shirttail."

Two other squirrel species, the red squirrel and the fox squirrel, are also hunted in North Carolina. The red squirrel, or "boomer", frequents the higher elevations of mountainous western North Carolina and is often hunted in conjunction with gray squirrels. While not as large as grays, red squirrels inhabit the same woods and can be included in the daily bag. The fox squirrel, on the other hand, inhabits the southeastern corner of the state from the Sandhills southeastward to the coast. These large squirrels, often twice the size of grays, come in a variety of color phases.

As fox squirrel populations declined due to the logging of so much old-growth pine, the daily bag limit was dropped to one squirrel per day with a season limit of 10. Wildlife officers who check fox squirrel hunters and others who monitor fox squirrel hunting and populations agree that the pressure on the fox squirrel has been reduced by the regulation change. This has helped to stabilize the population. In fact the fox squirrel has expanded its range in some areas this year. Today, because of the restrictive bag limit, most fox squirrel hunting isn't done for food but by hunters trying to accumulate a specimen of each color phase for mounting purposes.

What will it take to renew North Carolina hunters' interest in an underutilized resource like the squirrel? The answer lies with the thousands of hunters who take to the woods each year. Early- or late-season squirrel hunting is still a good way to enjoy the sport without too much conflict with deer hunters. Early-season hunting can be used to scout areas for later deer hunts. Success on late-season squirrel hunts should be good, particularly if you hunt the deer woods where many squirrels have already been seen.

Squirrel, rabbit, and quail hunters often attract considerable resentment from nearby deer hunters who feel that the woods should be left to them, particularly during the gun deer season. Compromises can usually be worked out.

Introducing a youngster to hunting is an excellent way to get back into squirrel hunting. Even if you don't have a child of your own, look around. Some wildlife clubs are starting to sponsor youth hunts, and this might be a way to generate a renewed interest in squirrel hunting. It is also an excellent opportunity for hunter-safety instruction. But, Mr. Deer Hunter, if you seem to be bothered by those pesky, bushy-tailed critters whose chattering always gives your presence away when you're after venison, try this. Put those expensive portable stands and all that camouflage clothing to use on a squirrel hunt. Fool those squirrels that seem to know when you're holding archery equipment, a .55 cal. smole-pole, or a .30-06. Slip into your stand with a .22 or a 20-gauge scattergun with No. 4 shot. You'll either get your limit in a hurry or find out that Ol' Mr. Squirrel is a little smarter than you thought.

If you lose a shot at a deer because of your deer season squirrel hunt, don't get too disgusted. With the large deer herds that span much of the state, you'll get another chance sooner than you might think. You can plan the next hunt over a scrumptious squirrel stew and curse me for talking you into the hunt. ⊠

***A good squirrel dog*** *(left) is rare. This method of hunting is effective, but is a tradition that is disappearing.*

# GOLD, BLACK ANTS & BROWN TROUT

In his 80 years, A. J. Johnson has seen a little of everything, but his love of North Carolina's trout fishing has endured the longest.

interview by Lawrence S. Earley and Jim Dean

***This rainbow took*** *a black ant, A. J. Johnson's bread and butter fly.*

*On the first Saturday in April in 1967, Alvin J. Johnson—known by all as A. J.—and some of his close trout-fishing friends were at his cabin beside Wilson Creek at Edgemont in Pisgah National Forest. Dr. Reid Bahnson, Frank Clinnard, Chester Davis and A. J.'s son, Alvin, were there and possibly some others now forgotten. Fishing the opening day of the trout season was an annual ritual, and no less exciting to a first-time visitor whose obsession with trout was already getting well out of control. Not to worry. A. J. took his visitor in tow and began to show him how to catch the spooky brown trout.*

*"If you can learn to catch the wild browns in these creeks around here, you can catch them anywhere in the world," he said. On that trip and subsequent ones, Johnson demonstrated his fly-fishing techniques as he has done for other friends, and his assessment of North Carolina's streambred trout has proven true in the years since that time.*

*Before his health slowed him up—he seldom fishes now—few anglers could keep pace with the lanky Johnson who could walk out of a goat-killing trail at the end of the day like a shopper on an elevator. Oddly enough, the first time you saw him fish, you might wonder how he managed to catch so many trout. Johnson rarely threw a truly tight loop or long line, he didn't tie innovative fly patterns, his leaders were heavy by most standards and he'd fish a huge dry fly until the hackles were unwinding.*

*Yet, he almost always outfished his companions because of his instinctive understanding of wild trout. This knowledge has garnered respect from many highly skilled anglers, including guides he fished with on Henry's Fork of the Snake River in Idaho and the Madison River in Montana. Nelson Bryant, outdoor editor of* The New York Times, *and the late Joe Brooks, angling editor of* Outdoor Life *and author of many well-known books, were among those who visited Johnson at his cabin and fished with him.*

*Yet for all his kinship with trout, it has been Johnson's keen interest in what you might call a maverick lifestyle that lends itself to his personality. How many people do you know who have prospected for gold in order to survive during the Depression; worked in the 1920's Florida land boom; built racing hydroplanes; managed a furniture plant and walked a jillion miles over nearly every creek in North Carolina looking for solitude and wild trout?*

*On a sparkling day in May, Larry Earley and I sat with A. J. and his wife, Bell, at the kitchen table in their home south of Winston-Salem. Larry plugged in the tape recorder, and this is part of what A. J. had to say during the next two hours.*

—Jim Dean

***A. J. Johnson looks back*** *on more than 50 years of trout fishing, knowing there are still clear streams and wild trout to catch.*

# Carolina Profile

I was born in Swepsonville, on the banks of the Haw River, on October the eighth, nineteen and five. So I've already seen Halley's comet.

My father moved to Raleigh when I was a couple or three years old. He knew some people over there in the contracting business. That's what he eventually wound up doing. About 1913 he bought about 250 acres of an old plantation, west of Lassiter's and Edward's Mill. I was already in the third grade when we moved out there and World War I was going on and my father started raising cotton and building on the side. I used to fish in Crabtree Creek. Used to be another little creek come down through our farm, called locally Turkey Creek, and it would have bullheads in it about the size of my hand, bullheads and horney heads. I used to fish for them things, take 'em to the house and talk my mother into cooking 'em.

Rabbits? Good gosh amighty. In the fall, when cotton was opening all around and people were hiring and everybody would come out and pick the cotton, I hunted rabbits. I used my dad's 12-gauge, Belgian-made double barrel. It had big old hammers on it—you had to pull 'em back. I'd shoot rabbits, take 'em into Raleigh and sell 'em for 25 or 30 cents. I could make more money killing rabbits than I could picking cotton. I never could pick more than about 75 pounds in a day.

When he was younger, my father hunted birds for the market. This was back in the last century. He used a net. I've seen one of those nets. My wife's father had one hanging down in an old shed he had on his farm in Davidson County. They were made of ordinary fish net in the center, and they had these little openings so the quail could go through. I don't know whether you know it or not, but you can get up on a horse and ride right up through a covey of quail and they won't fly—they'll just run. Well, my father and a Quaker boy hunted together. What they did is go out and locate a covey and then stake the net out. The net had wings, and they'd stretch those wings out at different angles and stake them down with a small stake. And then they'd get on their horses and drive those quail into that net. The quail would just run along the ground ahead of them and go right inside those wings and right into the openings. They took 'em to a store and got five cents apiece for them in the store. The guy just threw them into a barrel, and when he got a barrelful he shipped them off.

We stayed there until World War I got pretty serious and the government came in and condemned our land and was going to make a tank camp out of it. I don't know if they ever finished it or not. But I would have liked to have kept on living there. I didn't want to leave.

But then my father had to get out and look for another farm. He had some relatives up around Apex. Raleigh and Apex were about 12 miles apart at that time. Cary was there, about three or four houses and a couple of stores. That was about all. I don't know what's there now. Apex was a pretty good size of a town. My father talked to his relatives and they told him to raise tobacco instead of cotton. So he did that. I started to school in Apex and stayed there until I graduated from high school.

In 1923, another boy and I decided to go to Florida. We knew some people down there so we cranked up the old Chevrolet I had and headed on down Highway Number One, which was mainly sand-clay. And we went right through the center of every town between here and Miami, right down every main street. One night, I believe it was Friday or Saturday night, we ran out of gas and food. We had three flat tires and the tires were just chewed up. So we took the tires off and rode on the rims. We still had a few miles to go before West Palm Beach. My friend said, "How're we going to drive in that town?" I said, "Don't worry. I'm going down the middle of Main Street on the rims." And I did.

We worked in Miami until I left in the spring of 1927. My father and I got a job in Winston-Salem with a contractor who was an engineer in the army in World War I, and he was a real nice chap. We stayed with him for four years.

And then the Depression started in the thirties, and we ran out of something to do. We worked here and there for about a year and I went over to Langley Field in Newport News, Virginia, and I worked there for two years. You couldn't get a job anywhere. I've seen grown men with families just cry like babies because we didn't have anything for them to do.

I finally ended up in California. I had an old '29 Chevrolet Roadster and my father and I drove that out there carrying my brother and my sister. My mother was already out there. We wound up in Long Beach.

The day after I got there, I got my sister to look up two fellas I had met in Florida. One of them had gotten a job with the city, the other one, Joe Short, wasn't doing anything. Joe called me on the telephone and said, "A. J., I wish you'd come on over here because we're getting ready to go up to the old Doble Mining Camp day after tomorrow to do some prospecting for gold, and I want you to go with us."

So we drove up there and I think we stayed about a week or two there and then we drove over to Apple Valley and checked over there and it didn't look any good. Then somebody told us that the boys had built a road for the federal government over in the Trinity Alps. It was going into a river that they called the New River, a tributary of Trinity. We drove in there and met some other fellas who had had a claim staked out in there and they were beginning to work the diggings.

We stayed in there one whole summer and we had to get out before snow fell in October. We got out and went back down to Los Angeles. Joe had a brother who had some claims staked out over in Arizona, just off the Colorado River. We spent one winter there. I found some samples of pretty high-grade ore that ran about a thousand dollars a ton. But the rock ledge we were working on had slid off of a mountain at some time and wound up sitting on the side of the hill. We searched for two months for the main ledge and never did find it. We finally had to give up on it. We dug up all the ore that we could dig, and took it back to Los Angeles with us.

I started fishing for trout while I was up there in the Trinity Alps. There was a beautiful stream there that was divided up into small creeks kind of like some of ours. But the water was awful cold because it was mostly melted snow water. And the creek would get high in the early spring when the snow melted and gradually drop down. All the streams were just loaded with rainbow trout, and the main part of the river was loaded with steelhead. Of course the steelhead would only run at certain times—you had a spring run and a fall run.

The old man who was the head of that mining crew, he had a bamboo fly rod and a steel telescoping fly rod and he had an extra reel with it, and one Sunday morning he got up and he said, "A. J., do you want to go with me and catch a couple of trout for dinner?" And I said, "I sure do." So he and I went out down the main creek and he

"Shortly after I first started trout fishing in North Carolina, I ran across some mountain boys who were using some flies, but they were using wet flies. Nobody knew anything about dry flies."

***This big rainbow trout** would look good on a wall, or more likely in A. J. Johnson's supper plate, but he released it to be caught again.*

started looking under rocks for bait. We called them hellgrammites, but they were what we call stoneflies around here. You catch them things and stuff 'em in a Prince Albert can. And I caught all my trout on that.

But he used a wet fly right much. He fished like the mountain boys did here years ago—two flies on a leader. Between the two of us we caught forty-some trout. They ran from 10 to 12 inches. We didn't play them much. As soon as we could get 'em out, we took 'em out.

I came back to North Carolina some time in '32 or '33. I was staying with a family over near the old City Hospital in Winston Salem. My boss had been fishing some for brook trout up around Stone Mountain in Bullhead Creek, Rich Mountain, Rich Fork. I went up there a couple times. He didn't use flies—almost nobody used flies around here at that time. The first dry flies I saw were brought into this part of the country by our furniture designer, a man named Roger Carr.

Cap Weise was a great fisherman. He was headmaster over at the Patterson Boy's School at Lenoir. He and his boys had been stocking some brown trout all over around Ferguson and in that area. But Wilson's Creek was the first stream in North Carolina stocked with brown trout. There was some eggs shipped in from Ireland or somewhere in Europe, and they were hatched and some were distributed to a man who owns some property up in Linville. He took some of the fingerlings and put them down in the tributaries to Wilson Creek, and nobody heard anything from them for several years. Finally somebody caught one and it was 18 or 20 inches long. After that, oh boy, everybody started going wild at Wilson Creek.

I fished other streams, of course. Archie Coffey who ran a store at Edgemont, and died just this past year, would tell me about a stream once in a while. He told me about Lost Cove and I started fishing it. You had to walk about three miles to get there after you carried your car up to where the road ended.

Another good trout fishing stream was Garden Creek, a tributary of Bullhead and Roaring River. Garden Creek had a lot of brook trout in it, big brook trout, 12, 14 inches. And it had a world of rainbows in it. I fished Garden Creek by myself a lot. There's an old Baptist Church in there.

Everybody in those parts either bootlegged or hauled it, one or the other. Everybody drunk it, men, women, kids, everybody. I'd see some signs up a creek where someone had mashed the liquor in. One time Hugh Pinkston was with me and there was this boy Bill and a young girl in a

# Carolina Profile

## "I guess trout fishermen are kind of crazy. I waded water in winter when it was cold enough to freeze with just a pair of tennis shoes on."

cabin on top of a knoll there. We had caught right many fish that day, but we had gone up by his still and he had about 25 mash boxes settin' in the creek, and had a truck radiator or two hooked up to 'em—liquor had to go through the radiator coils. 'Course at that time the radiators were all copper; liquor is supposed to be run through copper tubing anyway. We saw his sugar sittin' on the tarp and they were using coke to fire the thing with—coke doesn't make any smoke. So we came on back down there and I told Pinkie, I said, "Just don't say anything about seeing this stuff up here."

The boy hollered to me as I was leaving. He wanted to know how far we'd been. I told him we went a long ways. Then he said, "Did you see anything going on up there?" I said, "Nope, not a thing. Everything looks as natural as usual."

So I talked to him a few minutes and Pinkie come on down the road and said, "You goin' to feel funny if somebody puts a bullet through you from a Winchester one of these days." And I said, "Well, I'm not afraid of him. He knows darn well that I ain't goin' to say anything about making whiskey to nobody."

Shortly after I first started trout fishing in North Carolina, I ran across some boys who were using some flies, but they were using wet flies. Nobody knew anything about dry flies. And they were using about a 4- or a 5-foot leader with loops tied in it. And all the flies they had were tied on snelled hooks, with the little leaders to 'em about six or eight inches long, and they didn't tie 'em on their main leaders. Their main leaders would probably test now at about 15 or 20 pound, maybe more than that, because you didn't have nylon then. We had catgut leaders. We had to put them between two pads and soak 'em before we could use 'em.

Some of the boys around Edgemont, some of them who worked for the Forest Service, were beginning to be pretty good fishermen. And all they did, they'd walk along by a big pool where they'd see a big rock in the head of it, and they'd dapple these flies. They'd try to keep the tail fly in the water and that would throw the other one about 4 or 5 inches above the water and it would just dapple on top of the water. And that's where they caught the most fish, on the one that was dappling. A lot of times they'd catch one on the tail fly. Some of the best fishermen I ever saw fished that way.

I found a pretty good technique for catching trout, and it came about in this way. This warden we had up along Wilson Creek years ago, they had imported him over from around Robbinsville in the Smoky Mountains. His name was Roy Lee, a great big guy, weighed about 190, 200 pounds. Built like a fire truck, and boy he could go up a mountain just like he was going downhill. He and his wife ran the checking station, and they had put a bunch of brown trout up there above the rough fish barrier where the deep pool is. I saw Roy and his wife settin' up on a big rock above the pool. He said, "Come up here and tell me how to catch one of these trout down here in the pool." I said, "You know darn well you can't catch them fish. They've been fished over a hundred times today, and there ain't nobody that can catch 'em." He said, "You do it anyway, I believe one will hit it."

So I threw a fly over in there and wiggled it around a few times, and the trout wouldn't even look at the darn thing. But it just happened I had let Frank Clinnard sell me three of these little ol' black ants, about a Number 12 black ant. And I told Roy, "I'll tie on one of these things and try it down there." Well I already had a dry fly on, so I just tied on another piece of leader to the eye of that fly. Then, I tied the ant on to the end of that piece so it would dangle under the dry fly.

I waved it around three or four times up on that rock and cast it out. Of course the ant sunk because it was weighted, and darn if one of those hatchery trout didn't come right up, scoop it up and start off with it. I sat right there and caught three fish before I lost a one. I told Pinkie about it after I come back. He had two or three of the flies and he tried 'em on some trout and he caught fish on 'em.

So from then on I've used black ants. I fish it pretty much like I fished it then. I usually take a 9-foot leader that tapers down to about 3 or 4 pounds at the tippet. Now I tie my dry fly on the end of that. If I'm going to use the tandem rig, I'll tie on 12 or 14 inches of smaller leader, a pound smaller, into the eye of the hook on the dry fly which is already tied on the line.

I fish it upstream, and the dry fly just floats on top of the water. The other fly sinks, and if it doesn't sink, I'll just put it in my mouth and wet it. It can be weighted, though. I'll catch trout on either fly. I first started out using a Wulff Royal as the dry fly, and I used Tellicos for a while for the tail fly, but now I don't use anything but a black ant as the tail fly.

The best fishing I ever had for catching fish to eat was in Little Laurel Creek. Once my wife Bell and I were staying at Rockhouse up over Fourth of July weekend. We had both kids with us. I hadn't caught any fish. The water had been low in Wilson and other streams, too. I told Archie, "I'd like to go somewhere where I could catch two or three fish." He said, "Go up here to the bridge and walk down about three or four hundred yards and you'll come to the mouth of Little Laurel Creek and you fish up it and you'll find brook trout, rainbow and brown." I did that and I think I had 7 pounds of dressed trout when I come out. Of course, that was many years ago, and Little Laurel hasn't had trout like that in a long time.

The biggest trout I ever saw was a 28 incher that came out of Lost Cove years and years ago. I only saw it after it was mounted, but that was about as big a fish as you'll ever see. I think I saw one down closer to the falls larger than that. I heard a noise in this pool one evening when I was going there late to fish. And I crept over as close as I could get to the water and looked over the top of a boulder and I saw two brown trout at the end chasing shiners, and you wouldn't believe the size of them. They'd chase these dace or whatever they were right on the bank. But they wouldn't hit a fly for me, so I never saw either one of them caught.

I guess trout fishermen are kind of crazy. I waded water in winter when it was cold enough to freeze, with just a pair of tennis shoes on. I was fishing on Basin Creek one day, and a forest ranger drove a jeep down there from the parkway and saw me fishing and he said, "What in the hell are you doing standing in the middle of that creek?" And I said, I'm trying to catch one of these brook trout here." He said, "Ain't you froze to death?" I said, "No." He said, "Are you cold?" I said, "No."

He said, "You trout fishermen are the biggest bunch of fools I ever saw in my life. You don't even know when the water's cold!"

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*"Carolina Profile" is a periodic feature in* Wildlife in North Carolina. *In these interviews, men and women reflect on their outdoor experiences and on what the land and its resources mean to them.* ⊠

Rector's Corner, Madison County, N. C.

# MOUNTAIN PORTRAITS

## Traditional rural life is slipping away in our hills and hollows, but it is remembered warmly and celebrated by many who live there.

photography by Tim Barnwell

In Tim Barnwell's photographs of western North Carolina, time has creaked to a halt somewhere back in the mechanical age. The world portrayed in Barnwell's stunning black-and-white images is one of traditional rural life, one that has almost disappeared across North Carolina, persisting only in remote mountain coves and valleys. Documenting this life has been the Asheville photographer's consuming photographic interest since 1978, and he feels a sense of urgency about his project today as he sees the traditions slowly fading from the mountains.

"I grew up in Marshall and areas like that," he says. "My father and mother both taught school there so I remember the way things were done and they've changed dramatically. I was talking to a farmer last week who has six children and only one of them is going to be a farmer. The rest have what he calls 'public work'—working for the state, teaching and things like that. They're moving out of the mountains."

Barnwell's photographic roots dig deep into soil made fertile by the great documentary photographers of the 1930s, men and women like Walker Evans, Russell Lee and Dorothea Lange. These photographers traveled throughout the South, sympathetically portraying the lives of Depression-mired people.

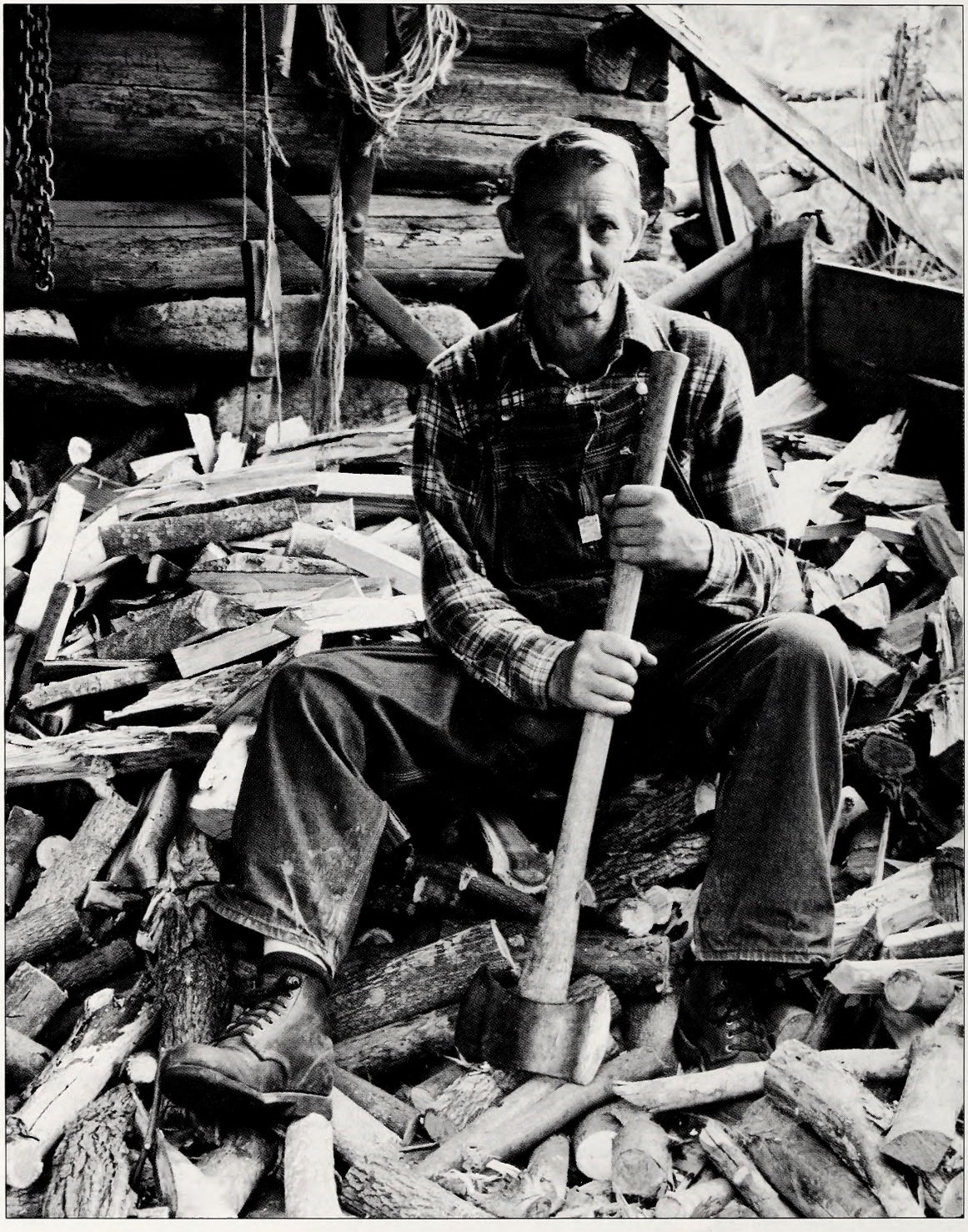
"They set the style for documentary photography for this century," says Barnwell, "but I'm not looking for poverty, and I don't want to be romantic about farm life because it's not—it's hard work. I try to take an unbiased view as much as I can, not show it as better or worse than it really is."

A mountain native, Barnwell attended UNC-Asheville in the early 1970s and then worked for *Mountain Living* magazine from 1976 to 1980. His project began as a magazine assignment although it has continued well beyond the demise of that journal. Today he is director of Appalachian Photography Workshops in Asheville.

He hopes his photographs of mountain life will enjoy their own life someday between the hard covers of a book. He's made the rounds of New York book publishers, searching for one that will take as much care in reproducing his images as he took in making them.

In the meantime, he'll be spending his spare time prowling the mountain roads, finding vestiges of fading mountain traditions. "Photography is just part of it," Barnwell says. "It's really an excuse to get out and meet the people and spend a day with them. You get to be friends and share things. I learn a lot and that's good for me."

—*Lawrence S. Earley*



**McKinley "Doc" Caldwell**
**Big Pine**
**Madison County**

"I can remember the time, when I was twelve, and my sister Fanny and I laid off and planted a field of corn that yielded three hundred bushels and my daddy never set a foot in the field. Fanny was a big girl then, maybe seven or eight years old.

"I was nineteen years old before my family owned a horse to work the fields with. Until then I used a steer. But back then, if one of us got sick, the doctor would walk miles to come help out. If the creeks were up, he would have to wait on the bank until they went down to cross. Now they tell me to call an ambulance and they'll get to me when they can."

**Delmos Cook**
**Cook's Service Station**
**Belva, Madison County**

"My uncle moved into this store in nineteen and twenty-eight, I believe it was. Another fellow and I went in partners for about seven years, then I got out of it for a while. A little later I moved back in, and now I've got thirty-seven, thirty-eight years in this store. That's a lifetime really. There's not many stores like this left now. Used to be there were several up every creek.

There was a fellow named Major Tweed that used to run a store and post office up at Whiterock, near the hospital. Even back then a lot of stores had closed up and he explained it to me the best I've heard it. He told me many a time that 'there's not a merchant around but what's pullin' for better roads, and cuttin' his own throat all the while.' When the better roads came in, people could travel farther, and didn't do as much business around where they lived. They didn't need stores as close to him once they could get out more."

**Mrs. Leona Rice**
**Mars Hill**
**Madison County**

"My grandfather worked for twenty-five cents a day cradling wheat. If they didn't have the money to pay him, they would give him a piece of fatback or a small poke of wheat in return. When I was younger, I worked nine and a half hours a day and four and a half on Saturday, and got paid twenty-eight dollars every two weeks. I learned to quilt from my mother and grandmother. I started piecing when I was ten and made my first quilt at seventeen. Back then people made them for covering and warmth, when you didn't have oil stoves—just a fireplace. They almost disappeared when other means of heating became available. Now they're used more for decoration than anything else."

**Amos Henderson**
**Lonesome Mountain**
**Madison County**

"I raised this chicken like a man would a pet. When he was young he got his foot caught between two pieces of tin. It got pretty messed up and I had to cut it all the way off. I should have killed him then, but I didn't. I kept him.

At night he climbs the bank and stays in the little house I built for him. He flies down here the next morning. I have to feed him 'cause he can't scratch for food like the others. I take care of him—just like a man would a cat or dog. I was thinkin' about cuttin' him a wooden leg out of cedar to help him stand up. I think I could do it too."

**Rex Meadows and son, Kevin**
**Mill Ridge**
**Madison County**

"Kevin's learning to hunt with the rest of our bear club. He did real well this morning. He stayed right with us all the way, and we probably walked five or six miles over these mountains, through pretty rough country. He's learning the safe way to hunt and the proper way to handle a gun—the same type of things my father taught my brother and me."

**Collie and Zola Payne**
**Big Pine**
**Madison County**

"We've lived here about thirty-two years. I built this house during World War II. Cut timber off the land to build it. I built my place up here because I like the mountains, I like to hunt, and I like my own privilege. I've hunted all my life, and that's one reason I live up here where I do. I've had one pistol for twenty-five years. I killed nine 'coons my first hunt with it. Now, if I'm out in the fields—and they're about a half mile straight up that mountain, through the woods—and Zola gets sick, or someone comes to the house, all she has to do is come out on the porch and fire it once and I know she needs me. I can tell its pop from any other in this valley."

# Autumn's Architects

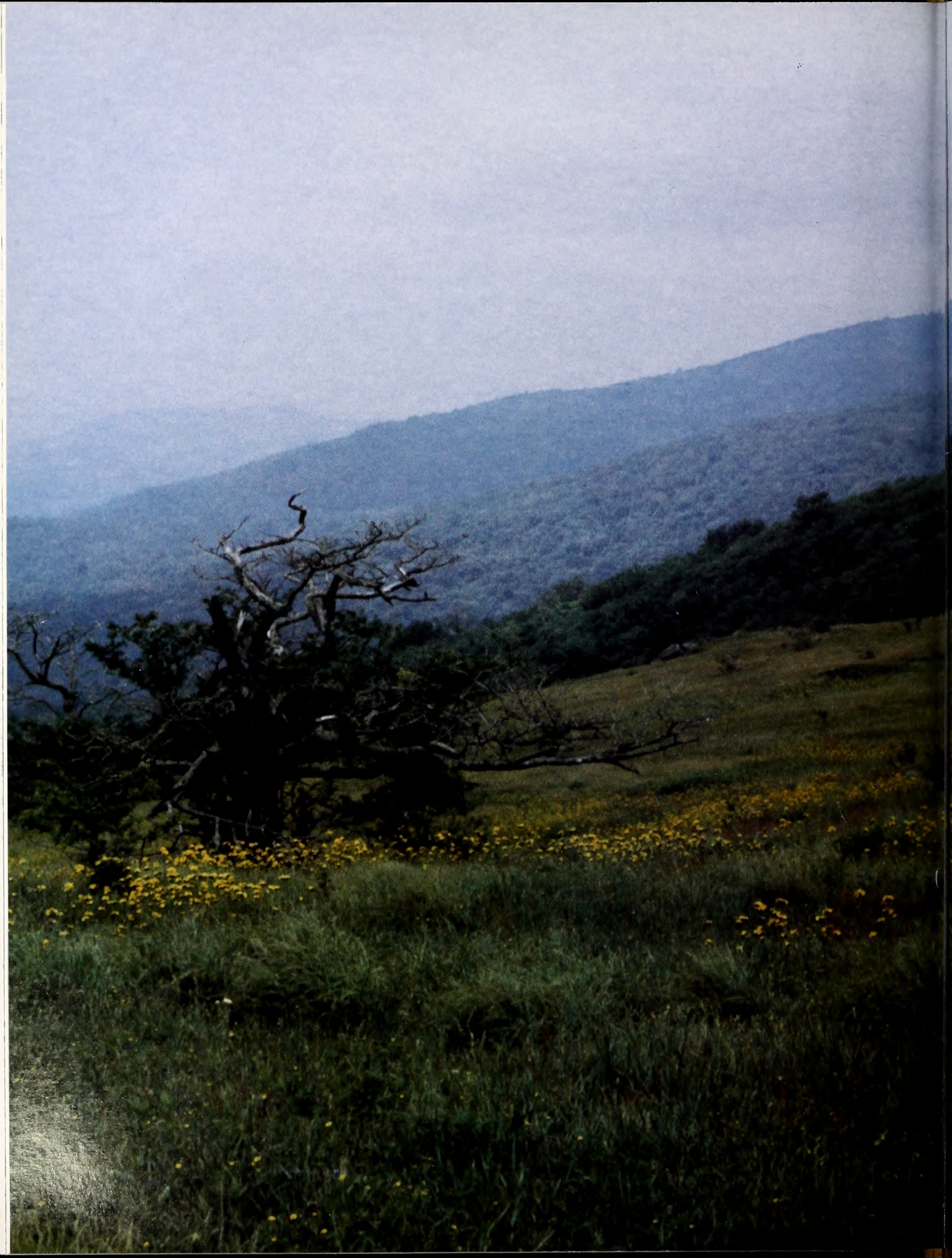
*Fall's signature is spun in countless webs as spiders take advantage of the season's bounty of insects.*

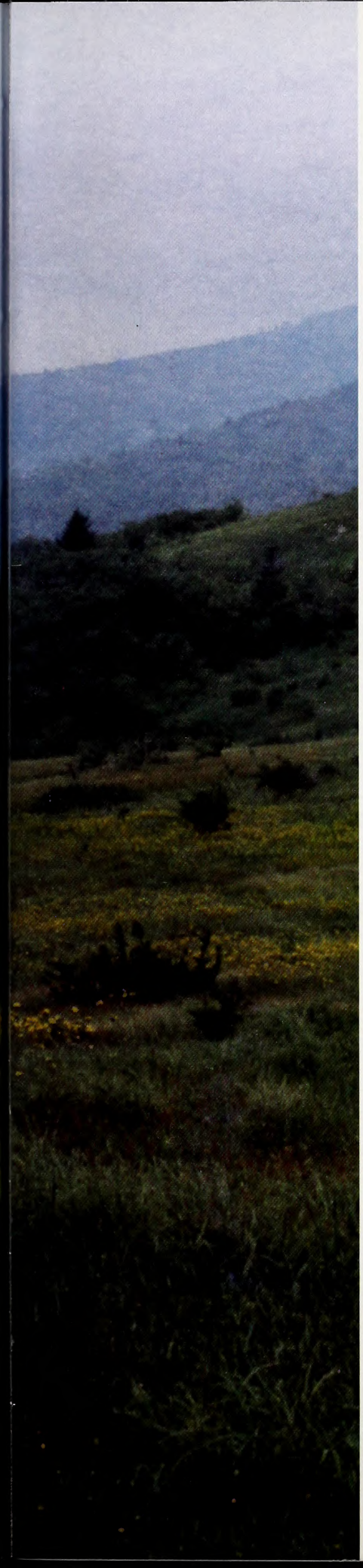
written and photographed by Lawrence S. Earley

*It takes morning dew and a sharp close-up lens to reveal the gossamer architecture of the grass spider (*Agelenopsis spp.*). Early on a fall day, a lawn or moss-covered rock may be strewn with dozens of the flat, handkerchief-sized webs, each with its architect and only resident concealed in the funnel.*

*This is no house built for a day. The half-inch, brownish spider built its web last spring soon after emerging from the egg sac, and as it grew it repaired and enlarged the web many times. While the argiope spider builds a stunningly symmetrical orb web and sits publicly at its center, the grass spider spreads a silken labyrinth among grass spears and then withdraws into the funnel like a diminutive Minotaur. Lacking sticky threads to trap prey, the grass spider's web must hold or slow up an entangled insect only long enough for the spider to quickly reach it. Dispatching it with a few bites, the spider drags the corpse into the funnel to feed.*

*The web is only a trap, and the architect just a hunter. But hung with globes of dew on a cool morning, a spider's maze teases us with its beauty.* ⊠





# *Stalking* RARE PLANTS

## They aren't easy to find, but North Carolina's rich and varied land is home to rare plants few people ever see.

by Laura Mansberg

Imagine yourself in hiking boots, wool sweater, and a wind parka: the narrow trail you are on leads away from a dark slope of spruce and fir toward another mountain, this one cloaked in a windswept mantle of grasses. Here, there are only a few trees and most of these are sculpted by the wind. Right away you realize that this is a special place—a habitat not often encountered in the warm temperate South. The wind carries cool moisture so thick you can almost cut it with a knife. Even the plants seem somehow foreign.

For instance, the grasses on the balds of Roan Mountain are more commonly found in the very northern reaches of our hemisphere, and are unusual in North Carolina. There are other rarities up here, although with different stories. A small white flower growing close to the rocky soil, Greenland sandwort, is also representative of northern climates, yet it can be found in similar habitats on many of the highest Appalachian peaks from New England to Alabama. The spreading avens is also here, tucked and clustered into cracks or against rock outcrops, but this rare plant is native to only a very small section of the Appalachians and to a specific habitat—the wind-buffeted, high-elevation shrub and grass balds of North Carolina and Tennessee.

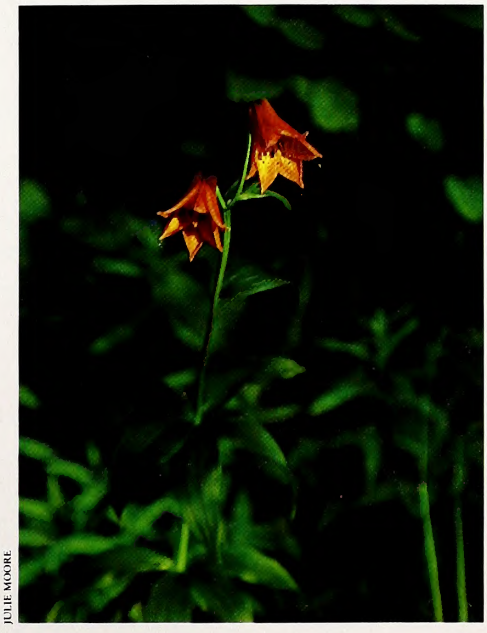
Indeed, if you want to stalk North Carolina's rare plantlife, by all means visit the Roan Mountain balds, but rare plants abound elsewhere in the state. With its long coast, its widespread upland areas and its ancient mountains, North Carolina possesses a diverse natural landscape with a multitude of habitats, of which the grassy bald is only one example.

Paralleling this diversity of habitats is a rich state flora: 3,500 species of vascular plants and 350 bryophytes (mosses). As with any flora or fauna, some species are very rare, occurring in only a few locations and in few numbers. Many are rare because their habitats are altered or destroyed by

***Cold and wet,*** *the Roan Mountain balds are an unusual habitat in North Carolina. Some of the state's rarest plants flourish in these grassy, windswept mountain areas.*

LAURA MANSBERG

***Gray's lily*** (Lilium grayi) *is a rare flowering plant that grows in balds on Roan Mountain. It is an endemic species, that is, one with a restricted range. This lily is found only in high, wet meadows of North Carolina and Virginia.*



JULIE MOORE

***Prairie plants in** North Carolina? Sure, and that's the reason the smooth coneflower* (Echinacea laevigata), *facing page, and the wild indigo* (Baptisia australis), *right, are among the rarest plants in the state. A rock type unusual for the state, appearing along the Eno River near Durham, weathers to produce soil supporting these two plants.*

JULIE MOORE

humans. Species whose survival is in jeopardy are called endangered or threatened species (the former term implying more imminent danger of extinction than the latter). In North Carolina, 77 species of our vascular plants are recognized by the North Carolina Plant Conservation Program and the North Carolina Natural Heritage Program as endangered or threatened.

How do botanists decide that a plant is rare? By looking at its geographic range or distribution, and the distribution of its habitat. "Endemic" species, for example, are those that are very restricted in range (like the spreading avens)—usually to a particular geographic province of a few contiguous states, or sometimes even to a single state. Oconee bells, a white-blossomed, low-growing plant with lustrous foliage, is a good example of an endemic species: found only along a 125-mile section of the eastern slope of the southern Blue Ridge, this plant's habitat is the uniquely moist and cool, deep river gorges of the Blue Ridge Escarpment. The site at which Oconee bells, or shortia, was originally discovered in the 19th century is now under the waters of Lake Jocasse in South Carolina, created by the impoundment of several rivers. Fortunately, Oconee bells is also known from several other sites and is in cultivation; but the fact that there are few appropriate sites available to it, combined with the likelihood of further manipulation of the powerful rivers dropping off the Blue Ridge into the Piedmont, create a dubious future for this native wildflower. It is currently recognized as endangered.

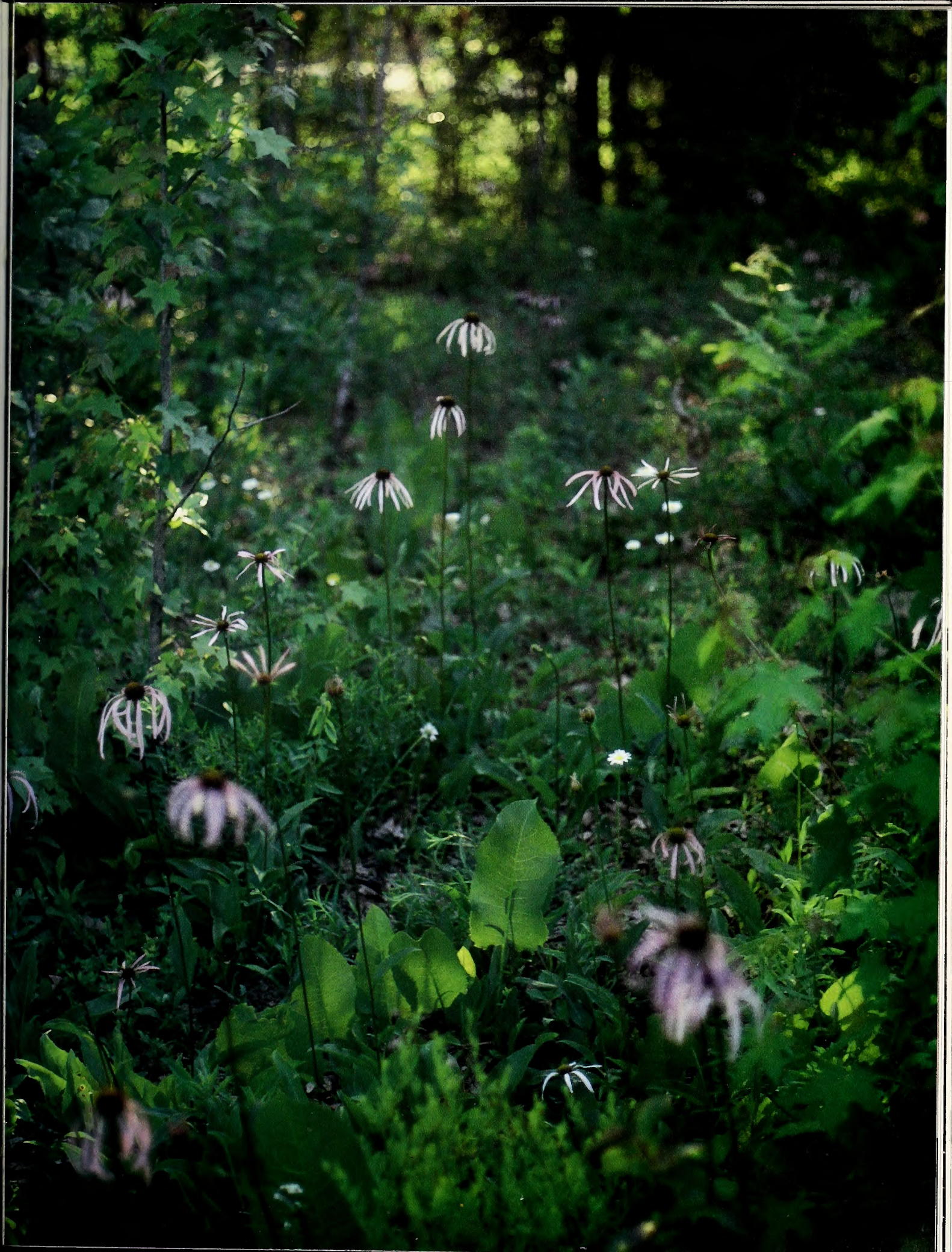
Another endemic plant species, this one threatened in North Carolina, is a lily that can also be seen on the Roan Mountain grassy balds. Gray's lily is native to grassy balds, woodland borders, and high-elevation wet meadows of Virginia and North Carolina. Its nodding red flowers, though less extravagant than some of our cultivated lilies, are strikingly beautiful against the backdrop of pale grasses and dark-leaved rhododendron. There are more populations of Gray's lily known than there are of Oconee bells, and its habitat does not seem quite as threatened by human disturbance. Still, its endemic nature (or limited distribution) makes it a rare and threatened species: if only a few of its populations were destroyed the species' continued existence would be in jeopardy.

The bog rose *(Arethusa bulbosa)* is a lovely pink-blossomed plant that is not endemic, but is still rare. This plant is "disjunct" to the mountains of North Carolina; that is, it primarily grows in the sphagnum bogs and peaty meadows of Canada, New England and several northern states, then makes a "leap" in geographic distribution to a handful of sites in Virginia and North Carolina. Not surprisingly, its habitat is also, in a sense, disjunct here. Wetlands—particularly sphagnum-dominated bogs—are rare in the Southern Appalachians, primarily because the steep, well-drained landscape offers few opportunities for these habitats to form. Thus, bogs are scattered here and there and the species populations associated with them are widely separated from their kin. In North Carolina, mountain wetlands (all wetlands, for that matter) are further made rare by the widespread practice of draining and filling them.

Another kind of a disjunct habitat in North Carolina is a bit of prairie on the rural outskirts of Durham. It's not exactly a true prairie, dominated by tall grasses and wildflowers with hardly a tree in sight, but several flowering plants native to prairie habitats of the midwestern states do bloom, year after year, at the edge of a pasture near the Eno River. Soils here are derived from a rock-type, known as Diabase, that occurs infrequently in North Carolina as scattered volcanic intrusions in the generally acidic gneisses, schists and phyllites of the Piedmont.

Under the hot summer sun this roadside is alive, first with the brilliant blue of wild indigo, a tough shrubby herb of the pea family that may have been used by early settlers for a dye. Later, yellow flowers of prairie dock bob on long stems, while pinkish-purple petals of smooth coneflower droop from the thimble-like heads of this member of the sunflower family. Each of these plants has a relative that is more common in North Carolina; but these particular species occur only here and a handful of other places in the Piedmont where the soils offer a high-nutrient diet similar to that of the rich black soils of our nation's prairies.

Many plants are rare and endangered not because of natural reasons, but because of human intrusion into the landscape. This is certainly true about some Coastal Plain habitats. Carolina bays—the strange elliptical depressions that vary in type from seasonally flooded cypress ponds to dense thickets of evergreen shrubs and pond pine—contain some of our loveliest and most endangered wildflowers. Because the water level of a single bay may fluctuate widely over the course of a year, the flowering plants that grow there are visible as successive waves of color and form. Some species may not even show during a particular year if hydrologic conditions are not just right. Boykin's lobelia may be one of these: botanists were cataloguing the flora of the bays of Scotland and Robeson counties for several years before they realized that this rare plant grew in several sites. Its slender stem and delicate wand of pale blue flowers are barely visible amid the waist-high grasses, sedges, and asters of the bay



***Threats to habitat*** *endanger some plants, such as the deciduous shrub white wicky* (Kalmia cuneata). *Its flowers look similar to those of mountain laurel, but they grow amid low pocosin species in our eastern Carolina bays. Only frequent burning can maintain these bays in the successional stage that supports white wicky.*

KERRY GIVENS

***Found in many places*** *in eastern North America from Canada to South Carolina, the small-whorled pogonia* (Isotria medeoloides) *is one of the rarest plants in the nation. Wherever it grows, its populations are small, making it endangered nationally.*

JULIE MOORE

in late summer.

Canby's cowbane, another tall and slight, delicately flowered herb of ponds and bays was, until a few years ago, known only from Delaware and South Carolina. When it was first seen in one of the water-filled bays of Scotland County no one was able to put a name on it. But in 1984, a year when there were literally hundreds in bloom at the one site, investigators from the University of North Carolina realized that it was the extremely rare *Oxypolis canbyi*. Even with the North Carolina site, the plant's known world-wide distribution consists of only 10 or 12 populations. What's more, in 1985 (an unusually dry year in the Coastal Plain) less than a dozen individual plants could be found. Without a doubt, this plant's survival as a species is in jeopardy.

Why are Canby's cowbane and some of the other bay species endangered or threatened? As with mountain wetlands, the bay lands have been drained and converted to agricultural land. Still other bays have been identified as valuable sources of peat, a potential energy source. Thus, the North Carolina chapter of The Nature Conservancy has begun the process of acquiring some of our Carolina bays. A sobering fact to remember is that even making a nature preserve out of a bay cannot ensure the survival of its rare species. Unless a large enough buffer of land surrounding it is also exempt from use, the important drainage patterns of the habitat can be inadvertently altered by activities on neighboring property.

Still another threat exists for bays and their unique flora: many of these rare plants will not survive in the bay habitat without periodic burning; in fact, the habitat itself may depend on fire. Some Carolina bays are densely vegetated with an evergreen shrub-plant community known as pocosin. One deciduous shrub that is sometimes found among the evergreen ones is white wicky, a kind of laurel whose flowers actually very much resemble those of the well-known mountain laurel. This flowering shrub is considered a state endangered species. Although in total numbers there is a hefty quantity of white wicky, it may not be able to survive the eventual succession of low pocosin into taller, denser plant communities. A periodic burn of the low pocosin, however, can probably ensure the survival of this species at any one site.

Another habitat that also needs a periodic burn of its understory is the wet pine savanna of the Coastal Plain. This habitat or natural community has been referred to as possibly the most diverse (in terms of numbers of plant species) of all of our habitats. Among the grasses that carpet the ground beneath widely spaced longleaf pines in a typical savanna, one can find many species of orchids as well as insectivorous plants—venus fly trap, pitcher plant, and sundews. The rarities of this habitat include roughleaf loosestrife, Carolina grass-of-Parnassus, and Cooley's meadowrue.

FRED ANNAND

***Carolina grass-of-Parnassus*** (Parnassia caroliniana) *springs from the wet areas in the pine savannahs of our Coastal Plain. It also relies on frequent burning of the grassy savannahs to maintain its toehold in North Carolina.*

Each of these utilizes a different microhabitat within the larger savanna habitat. The yellow-flowered loosestrife actually occurs in the transition zone between the true savanna and the pocosin vegetation that often threads through and around a savanna. The delicate Cooley's meadowrue is restricted to savannas that have a calcareous or limey substrate beneath them, a rare type of savanna that has so far been found only in Pender and Columbus counties. Grass-of-parnassus hugs the seeps and wet spots, also in these calcareous savannas. Each of these flowering plants also needs an open habitat—the semi-shaded understory of the savanna. Thus, fire is the key to their survival, because a periodic burn prevents the growth of shrubby species that would compete for precious understory space.

Finally, there are the mysteries of the rare plant world. Botanists have yet to figure out why one of the rarest species in the nation—small-whorled pogonia—occurs where it does. This tiny, pale yellow-green flowered orchid of eastern North America does not appear to be partial to any particular habitat, or if it is, humans have yet to understand just what that is. Small-whorled pogonia has been found in Canada and the states from Maine to South Carolina, as well as westward to Michigan and Missouri. It is unusual for such a widespread species to be considered nationally endangered, but the truth is, it is rare everywhere, occurring in small numbers at just a few sites in each of these states. Combine this with the fact that, like most orchids, small-whorled pogonia cannot be propagated by seed, and you have your quintessentially rare and endangered species.

In the cool misted morning of a foray to the mountains, or under the blistering sun of an afternoon in a coastal savanna, the stalker of elusive plants can be rewarded by a sight that few can claim to have beheld. North Carolina's rare plants are more than merely beautiful. They are living lessons that highlight the uniqueness of certain habitats in our state. They remind us that some of these habitats have management needs that we can attend to while others simply need protection in the form of nature preserves. ⊠

*Tar Heels Take Second*

# Pennsylvania Wins Hunter Education Tournament At Lejeune

*Written and Edited by Mark Taylor*

Pennsylvania bested North Carolina and Virginia to capture top honors in the senior division of the North American Hunter Education Grand Championship held July 23-27 at the Camp Lejeune Marine Base near Jacksonville and also finished first in the junior division ahead of Maryland and Utah.

The four-day tournament was sponsored by the National Rifle Association and the North American Association of Hunter Education Coordinators, and was hosted by the N. C. Wildlife Resources Commission. Thirteen states and provinces from throughout the United States and Canada entered teams, and participants competed in all six events. These were small-bore rifle shooting, archery, shotgun "hunter clays" which simulated shots in hunting situations, a hunter-safety trail which tested safe hunting and gun handling under field conditions, outdoor skills, and a written exam.

"All of these teams had won their state or provincial hunter-safety tournaments, and the quality of the competition was very high," said Captain Wilton Pate of the N. C. Wildlife Resources Commission, who served as tournament director.

The overall senior champion team from Pennsylvania finished first in the hunter-responsibility examination, outdoor skills, and the hunter-safety trail and second in archery. The winning Pennsylvania junior team finished first in outdoor skills and the hunter-safety trail, second in the hunter-responsibility exam and rifle shooting, and third in archery.

North Carolina was represented by hunter safety shooting teams from West Davidson High School in Lexington in the senior division and West Bertie Elementary School in Roxobel in the junior division. These teams both finished first in the 1986 North Carolina Hunter Safety Shooting Tournament last April. The West Davidson team is coached by Kevin Long, and members are Gregory McElrath, Ramie Spainhour, Allen Lamb, Chad Hartley, Bodie Owens and Randy Daniels. The West Bertie team is coached by Bobby Occena and members are Brandon Craft, Shay Watts, Walter Harrington, Clint Townsend and Lee Bunch.

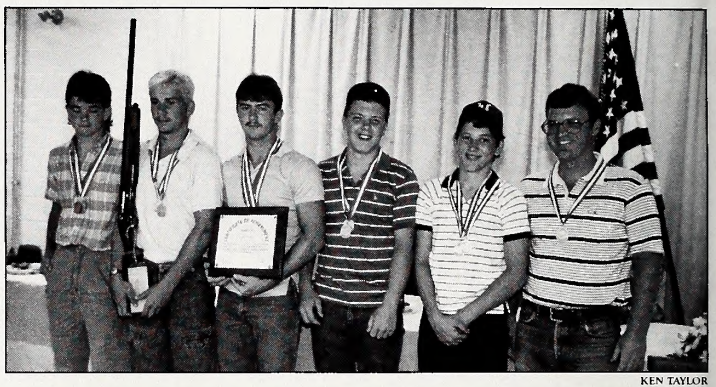
West Davidson High School finished second overall, and placed first in rifle and shotgun competition and third in the hunter-safety trail. The West Bertie team placed third in shotgun, hunter-responsibility exam, and the hunter-safety trail.

Individual winners were recognized overall and in each event. The overall champion in the senior division was Vince Halisky of Alberta, and Bobby Connolly of Maryland in the junior division. However, Brandon Craft of West Bertie Elementary School tied for second place overall with Darin Vough of Pennsylvania in the junior division, and Craft finished first in the shotgun competition and the hunter-responsibility exam. West Bertie's Clint Townsend tied for third in the shotgun competition.

West Davidson's individual winners were as follows: Greg McElrath finished first in rifle competition and tied for third in archery, Randy Daniels was first in shotgun competition, Bodie Owens tied for first in the hunter-responsibility exam, and Chad Hartley tied for second in archery.

The tournament was conducted by staff and volunteers from the National Rifle Association, and volunteers and personnel from wildlife agencies in Pennsylvania, Alberta, Virginia, Utah, Rhode Island, Maryland and Louisiana.

"This tournament was a great success thanks to all of the organizations and individuals who pitched in to help," said Pate. "We'd especially like to thank the U. S. Marine Corps, though, for allowing us to host the tournament at the facilities at Camp Lejeune."



KEN TAYLOR

***A Proud Day:*** *West Davidson High School of Lexington finished second in the senior division of the North American Hunter Education Grand Championship at Camp Lejeune. From left to right are team members Allen Lamb, Randy Daniels, Greg McElrath, Bodie Owens, Ramie Spainhour and Coach Kevin Long.*

KEN TAYLOR

***Fine Shooting:*** *The winning senior team in the North American Hunter Education Grand Championship was from Albion, Pennsylvania. In the front row, left to right, are Hunter Safety Coach Paul Taylor, team members Russell Byerley, Jamie Sherman, Michael Wheeler, and Head Coach and Rifle Instructor Larry Valentine. In the back row, from left to right, are District Game Protector and Outdoor Skills Wildlife Identification Coach Shayne Hoachlander, Archery Coach Brad Swanson and team members Kary Valentine and Mickey Ruland.*

*Cooperative Effort With Ducks Unlimited*

# MARSH Project Helps Currituck Waterfowl

Ducks Unlimited's MARSH (Matching Aid to Restore State's Habitat) program will be a first for North Carolina and the nation. The Wildlife Commission recently voted to construct the first cooperative MARSH project at the Mackay's Island National Wildlife Refuge in Currituck County, the long-time home of the late Joseph Knapp, who helped found Ducks Unlimited almost 50 years ago. A water-control structure, which will improve and maintain waterfowl habitat on the refuge, is being built using MARSH funds.

"We feel that it's very appropriate that Mackay's Island is the site of North Carolina's first MARSH project," said Jerry Wright of Jarvisburg, chairman of the N. C. Wildlife Resources Commission and a native of Currituck County. "The late Joseph Knapp was one of the founders of Ducks Unlimited, and he and some of his friends held the first preliminary meeting on Mackay's Island in the 1920s to discuss the need for an organization like Ducks Unlimited. Knapp realized that waterfowl populations were going to need help, and consequently the origin of Ducks Unlimited can be traced to this island. The MARSH program continues in his tradition by protecting wintering habitat for waterfowl in North Carolina and other states."

Traditionally, Ducks Unlimited has focused on preserving breeding habitat for waterfowl in Canada. Chapters composed of waterfowl hunters raise funds for this purpose through annual banquets, and Ducks Unlimited has become known as one of the nation's most effective private conservation organizations. Recently, the loss of wetlands in the "lower 48" has focused attention on the need to preserve wintering habitat for waterfowl. Consequently, Ducks Unlimited developed the MARSH program, which returns 7.5 percent of the funds raised by Ducks Unlimited to state wildlife agencies for the acquisition and management of waterfowl habitat. The allotments are based on the revenues raised by Ducks Unlimited chapters in each state. The Mackay's Island project, for example, is being supported by $15,000 from the MARSH funds returned to North Carolina.

"The MARSH program has great potential to protect and improve waterfowl habitat in North Carolina," said Hal Atkinson, chief of the Wildlife Commission's Division of Wildlife Management. "The Mackay's Island MARSH project, for example, will improve habitat in one of the most important wintering areas for waterfowl on the East Coast, and this will provide a direct benefit to the sportsmen in North Carolina who support Ducks Unlimited."

The roots of Ducks Unlimited lie with More Game Birds, an organization founded by Joseph Knapp in North Carolina in 1930. Knapp owned several publishing houses in New York, but also loved waterfowl hunting and spent most of his spare time at a home he maintained on Mackay's Island. This is where he conceived the idea of More Game Birds. However, the dust bowl of the 1930s focused attention on the need to preserve waterfowl breeding habitat in the prairie provinces of Canada in order to maintain healthy waterfowl populations throughout North America. Consequently, More Game Birds became part of Ducks Unlimited when the organization was chartered in 1937.

NORTH CAROLINA COLLECTION—UNC

***A Fitting Tribute:*** *The late Joseph Knapp, a part-time resident of Currituck County, was one of the founders of Ducks Unlimited. Knapp's former home on the Mackay's Island National Wildlife Refuge is near the site of North Carolina's first MARSH project, a cooperative effort to restore wintering waterfowl habitat by Ducks Unlimited and the Wildlife Commission.*

Knapp's contributions were not limited to waterfowl, however. He was very interested in education, and donated nearly $1 million to Currituck County to develop a model school system. He also established the Knapp foundations of New York and North Carolina, which continue to support philanthropic projects.

"There could be no more fitting tribute to Joseph Knapp and his love of waterfowl than to undertake North Carolina's first MARSH project on Mackay's Island," concluded Wright.

## Field Notes

| | |
|---|---|
| Eastern muzzle-loading deer | Oct. 6-11 |
| Eastern gun deer | Oct. 13-Jan. 1 |
| Western muzzle-loading deer | Oct. 6-11 |
| Wild boar | Oct. 13-Nov. 22 & Dec. 15-Jan. 1 |
| Black bear (western) | Oct. 13-Nov. 22 & Dec. 15-Jan. 1 |
| Gray and red squirrel | Oct. 13-Jan. 31 |
| Fox Squirrel | Oct. 13-Dec. 31 (in open counties) |
| Raccoon (western) | Oct. 13 (at sunrise)-Jan. 31 |
| Raccoon (eastern) | Oct. 20 (at sunrise)-Feb. 28 |

Check regulations digest for information on season boundaries, bag limits, and other regulations. Waterfowl regulations are set within a framework of federal regulations, and were not yet available at press time. Copies of the waterfowl regulations may be obtained from license agents. Sportsmen are reminded that all big game (deer, bear, wild boar) must be tagged and reported to a wildlife cooperator agent.

The Wildlife Commission strongly recommends that all hunters wear hunter-orange clothing when hunting big and small game.

*Increases Visibility and Prevents Accidents*

## Blaze Orange Clothing A Hunter's Best Friend

Hunting is statistically a safe sport, but hunters can reduce the risk even further by wearing highly visible clothing —especially blaze orange.

With an estimated 451,00 hunters afield last year, there were 36 hunting accidents. Fifteen accidents were caused by the victim being mistaken for game, being out of sight of the shooter, or moving into the line of fire.

"Experience from other states show that the use of blaze or hunter-orange clothing reduces accidents considerably, and virtually eliminates hunters being mistaken for game," said Colonel Winfield Rhyne, Enforcement Division chief with the N. C. Wildlife Resources Commission. "Many hunters feel that wearing red wool jackets or other traditional hunting clothing is adequate. But, when light conditions are poor, such as at dawn, dusk, or in overcast and rainy weather, these colors just don't show up. You can spot a hunter-orange cap or jacket, though, when you can't see much else.

"Although the use of hunter-orange clothing isn't mandatory in North Carolina, we strongly urge all big game and small game hunters to wear it. Even if you're just hunting from a tree stand, you should wear hunter-orange on your way in and out of the woods."

Ten of last year's accidents were accidentally self inflicted, caused by carrying loaded firearms in vehicles, falls, improper crossing of obstacles, and firearms falling from insecure rests.

"We can't overemphasize the importance of safe gun handling," said Rhyne. "Many self-inflicted accidents result from violations of basic safety rules. For example, firearms should always be unloaded when carried in vehicles, before crossing a fence or other obstacle, and when they're being hauled up into a tree stand."

Rhyne also urges new hunters to take one of the hunter safety courses sponsored by the Wildlife Commission. These courses are taught by volunteer instructors through schools throughout the state. Special courses are also available for adults.

"These courses teach students the principles of safe gun handling and hunting," he said. "Of course, there's no substitute for learning to hunt under the direction of a safe and experienced hunter. But, these courses offer an excellent introduction to hunting and the shooting sports.

"Be sure of your target before you shoot, know where your hunting companions are, and be sure that nothing is in the line of fire," Rhyne concluded. "Once you fire a bullet you can never bring it back."

*Designed For Teachers*

## Bluebirds Topic Of Winter Workshop

Interested in setting up a bluebird trail with your class, scout troop, or church group? If so, don't miss the bluebird and cavity-nesting songbird workshop at the Betsy-Jeff Penn 4-H Center near Reidsville on January 23-24. The event is sponsored jointly by the Bluebird Society and the Wildlife Commission.

"This workshop is primarily for teachers and leaders of youth groups," said John Alderman, Piedmont nongame and endangered project leader for the Wildlife Commission. "Participants will learn about winter feeding, management of bluebirds, and how to set up a bluebird trail. They will also build a bluebird box, which they can keep. The workshop will deal mostly with bluebirds, but the information also applies to cavity-nesting songbirds such as woodpeckers, nuthatches, and chicadees."

The cost of the workshop is $20 (includes meals, lodging, and materials). For more information contact the Bluebird Society, P. O. Box 4191, Greensboro, N. C. 27404

## Decoy Collectors Organize Group

Anyone who is interested in collecting decoys, or learning more about North Carolina's waterfowl heritage, should consider joining the Carolina Decoy Collectors and Carvers Association.

The association recently met in Raleigh, and decoy collectors and carvers attended from throughout the Southeast. In addition to a buy-sell-swap session, a panel of experts helped members identify decoys of unknown origin. Also, an illustrated lecture on the hunting clubs of Back Bay and Currituck Sound was presented by members Archie Johnson and "Bud" Coppedge of Virginia Beach.

Dues are $10, and the association meets at least twice a year. Membership information is available from Philip Harvey, Route 1, Box 153, Tyner, N. C. 27980.

## Phelps Dugout 3,000 Years Old

How old was the Lake Phelps dugout canoe featured in "Digging Up The Distant Past" in the August issue of *Wildlife In North Carolina?*

"The radio-carbon testing dates this canoe at 2,850 BP (Before Present) plus or minus 60 years," said Richard Lawrence, an underwater archaeologist for the N. C. Division of Archives and History. "This works out to roughly 900 BC. Another canoe recovered from Lake Phelps shortly before was dated at 800 BC. Both canoes were made of cypress."

The 31-foot canoe has been preserved at Pettigrew State Park on Lake Phelps. The canoe was placed in a long trough containing a sugar and water solution. Sugar was gradually added until the canoe was saturated. As the solution evaporated the sugar crystalized in the structure of the wood.

"This is one of the most effective and least expensive methods of stabilizing and preserving large wooden artifacts such as boats," said Lawrence. "However, we found we needed to add a bacteriacide to the solution after one of our early efforts, another dugout canoe, fermented."

Shortly after the dugout from Lake Phelps was recovered, others were found.

"We've found portions of five other Indian dugouts in Lake Phelps, one measuring nearly 37 feet," he said. "We also searched the lake bottom and found lots of pottery, and even a piece of a soapstone bowl which predates pottery. It's possible that the lake level was lower in the past, and that these are the submerged remains of Indian villages."

*Credit Card Purchases Help*

## Lifetime Licenses More Popular

Lifetime hunting and fishing licenses are becoming almost as popular as bass plugs and shotgun shells with Tar Heel sportsmen. A provision that allows lifetime licenses to be purchased with MasterCard and Visa credit cards has made them affordable to almost everyone because payments can be spread out over time. Early last summer the Wildlife Commission sent a letter to holders of annual sportsman's licenses informing them that lifetime licenses could now be purchased with MasterCard and Visa.

"We were literally swamped by applications for lifetime licenses," said Connie Spivey, chief of the Wildlife Commission's Division of Administrative Services. "We received over 100 lifetime applications a day for a couple of weeks after the letter was sent. By the end of July, we had sold over 590 lifetime sportsman's licenses as a result of this mailing.

"We'd like to thank all of the sportsmen who purchased these licenses," she said. The money is placed in the Wildlife Endowment Fund, and interest earned from this fund helps support CATCH, the Wildlife Commission's youth fishing program, production of a free environmental education primer for teachers called *Carolina Notebook*, and many other worthwhile conservation projects.

Applications for lifetime licenses are available from license agents, Wildlife Commission employees, or from the License Section, N. C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N. C. 27611. Lifetime subscriptions to *Wildlife In North Carolina* may be obtained from the Division of Conservation Education at the same address.

## Wildlife Goes To State Fair

The North Carolina State Fair is set for October 17-26, and if you're planning to visit, be sure to stop by the Wildlife Commission's exhibit near the Village of Yesteryear.

This year's exhibit will include the ever-popular live fish in aquariums. Black bear management and biology will also be featured in addition to outdoor ethics and other Commission programs. Representatives from various divisions within the Commission will be on hand to answer questions.

Subscriptions to *Wildlife In North Carolina* magazine, and applications for lifetime hunting and fishing licenses, will also be available.

*From Ducks Unlimited*

## Commission Receives Grant

DEBBIE CONGER

***Dollars For Ducks:*** *The N. C. Wildlife Resources Commission recently received Ducks Unlimited's Bronze State Grant Award. This new award honors states which have contributed a minimum of $100,000 to help support Ducks Unlimited programs. To date, North Carolina has made contributions totaling over $140,000. These contributions are made annually as a result of a state law which requires that $1 from the sale of every annual and six-day nonresident hunting license be given to an organization doing waterfowl conservation work in Canada.*

*Here, Wildlife Commission Chairman Jerry Wright of Jarvisburg (left) and Wildlife Commissioner Stuart Paine of Southern Pines hold the plaque.*

## The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. Interest is earned through investments made by the State Treasurer's Office. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

**Status on June 30, 1986**

| | Numbers Sold | Revenue Received |
|---|---|---|
| Lifetime Sportsman's License | 18,205 | $5,408,243.60 |
| Lifetime Hunting License | 134 | 27,156.50 |
| Lifetime Fishing License | 1,233 | 219,469.72 |
| Lifetime Subscriptions to Wildlife in N.C. | 751 | 91,641.40 |
| Contributions | — | 73,038.77 |
| Fund Total | | $5,819,549.99 |
| Total Interest Earned | $1,220,912.67 | |

## Calendar Of Events

**October 3-4**
U. S. Open King Mackerel Tournament in Southport. Sponsored by the Southport-Oak Island Chamber of Commerce, Rt. 5, Box 52, Southport, N. C. 28461

**October 3-5**
October Marsh and Sea Fest at the Roanoke Island Marine Resources Center in Manteo.

**October 10-11**
6th annual statewide American Indian Cultural Festival at the Cumberland County Memorial Auditorium in Fayetteville. Traditional Indian crafts and dancing.

**October 11**
32nd annual Mullet Festival in Swansboro. Parade, crafts, and fish fry.

**October 24-26**
Autumn Living History Weekend at the Duke Homestead State Historic Site in Durham. Soap making, candle dipping, and other 19th century skills.


# A TIME FOR GIVING...

## The 1987 Wildlife Calendars have arrived.

Larry Barton, Bob Dance, Sallie Middleton, Bob Henley, and Alan Cheek are among the artists featured this year. You will also find information about wildlife, hunting seasons, boating access areas, ferry schedules, and much more.

For art reproductions suitable for framing and information for use throughout the year, order your wildlife calendar today! **(But hurry, last year we sold out!)**

Please send me . . . . . N.C. Wildlife Calendars at $6.00 each $_____
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Enclosed is my check for . . . . . Total $_____

Name _____
Address _____
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Phone (_____) _____

Send order to: CALENDAR; N.C. Wildlife Resources Commission; 512 N. Salisbury Street; Raleigh, N.C. 27611

All orders must be prepaid. We do not bill. A $10.00 charge will be made on returned checks. (N.C. G.S. 25-3-512).

**For fund raising and bulk rate information (10 calendars or more), call 919-733-4567. Please allow 4-6 weeks for delivery.**

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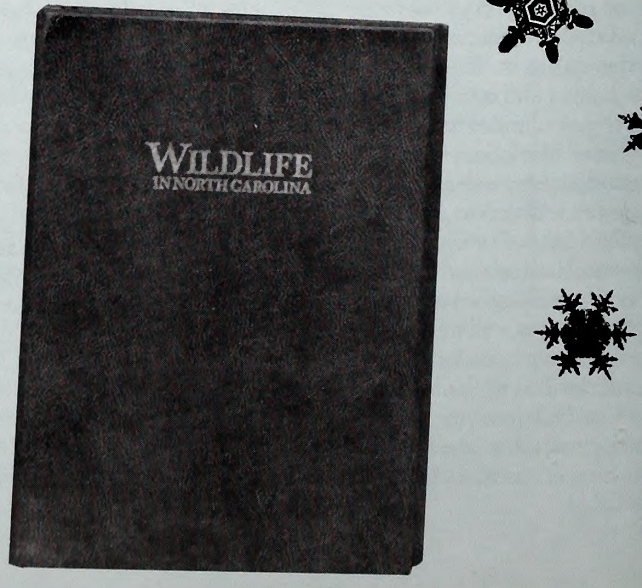

# Now you can charge them!

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To order, use the form on the left. This offer may be withdrawn, so please take advantage of it right away.

**Sunset Squirrels**

At day's end, two young squirrel hunters reflect on nature's complex, yet renewable, web of life and death.

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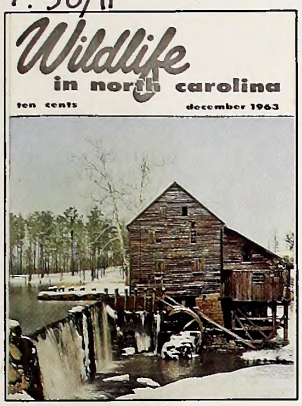
50th ANNIVERSARY

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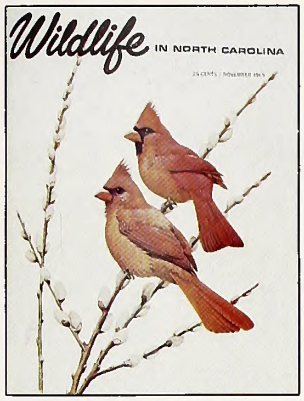


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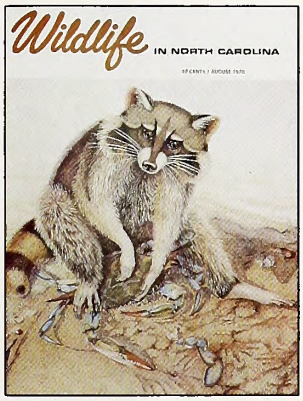


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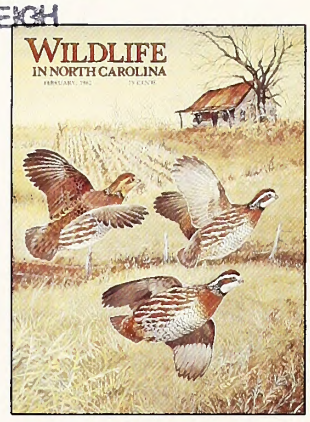


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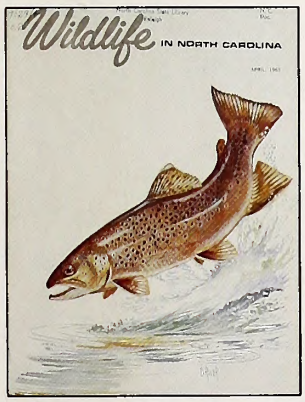


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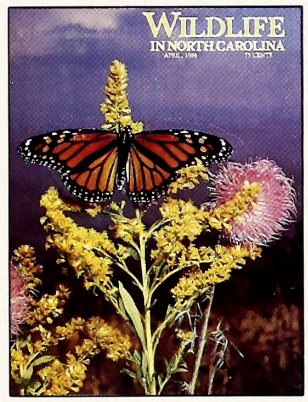


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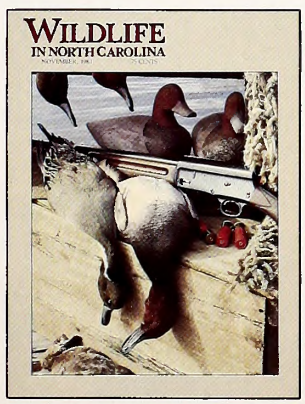


November 1981

March 1986

WILDLIFE
IN NORTH CAROLINA
MAGAZINE

Dear Readers:

This is a big year for *Wildlife In North Carolina*. With this special issue we're celebrating the beginning of our 50th anniversary year, and we'll complete our birthday celebration next year with the publication of our first book.

Those of you who have been reading this publication over the years may find some familiar names, photos and artwork here. We hope you enjoy seeing them again as much as we did looking back through all the old issues to dig them out. This month's cover repeats 26 of our favorite past covers, beginning with the November 1937 *Wildlife Management In North Carolina*, a small pamphlet that was our direct ancestor. Another decade elapsed before the present N.C. Wildlife Resources Commission was formed in 1947 as the state agency responsible for managing the state's wildlife populations.

Of course, *Wildlife In North Carolina* has been the official publication of this agency ever since because the Wildlife Commission has traditionally believed that education is one of its most important roles. It's not enough to conduct research, management and habitat improvement for all the state's game, nongame and endangered species. It's not enough to provide proper regulation of the sports of hunting and fishing that largely sustain this vital stewardship. A sound future for all wildlife species also depends upon citizens who have a good knowledge of our natural world, and how it all fits together.

There have been a lot of changes during the past 50 years, and many of them have adversely affected wildlife. We've lost habitat, and pollution has taken its toll. But there have also been success stories, and many species from deer to turkeys, brown pelicans to bald eagles are more numerous today than they were in 1937. That's largely because sportsmen and others cared and paid the price. Share with us this salute, for it is really a salute to you, our readers and supporters. Join us in the hope that the next 50 years will be prosperous for North Carolina's rich heritage of wildlife.

The Editors

November, 1986
Volume 50, Number 11

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Department of Natural Resources
and Community Development

S. Thomas Rhodes / Secretary

North Carolina Wildlife Resources Commission

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# WILDLIFE IN NORTH CAROLINA

*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

***Duane Raver** (left), Rod Amundson (middle), and Jack Dermid (right) guided* Wildlife In North Carolina *in its early years.*

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**Cover** *Celebrating* Wildlife In North Carolina's *50th anniversary, these 26 past covers illustrate the changes that have taken place since 1937. If you're a long-time reader, you may remember some of them.*

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# 50 Years With *Wildlife In North Carolina*

It began as little more than a pamphlet issued irregularly, but a lot of people have been part of it since that first issue.

by Mark Taylor

The small brochure tucked away in the stacks at the state archives is a modest affair. On its cover is a simple drawing of a quail under the title, *Wildlife Management In North Carolina* . A message on the inside cover says its purpose is to "bring together and present ideas, management practices, research activities, and progress in game management for the benefit of farmers and landowners, sportsmen, game managers, and students of game management in North Carolina . . ."

This eight-page brochure, dated November 1937, is Volume 1, Number 1 of the publication that would become *Wildlife In North Carolina* magazine. Over the past half century, *Wildlife In North Carolina* has undergone several major changes in name and appearance. As the publication enters its fiftieth year, however, its purpose remains much the same although the audience has been expanded to include all of the citizens of our state and its scope now encompasses all of our wildlife, fisheries, and related natural resources.

Initially, *Wildlife Management In North Carolina* was a joint effort of the zoology department at N. C. State College and the N. C. Department of Conservation and Development, the predecessor of the N. C. Department of Natural Resources and Community Development. A wildlife curriculum had just been established at State College, and one of its missions was to work with the State Division of Game and Inland Fisheries to promote the new science of wildlife management to sportsmen and landowners.

"The modern farmer using tractors and farm machinery tries to utilize every available foot of acreage on his farm. Therefore, we do not have the wide hedgerows and cut-over thickets that once were numerous and offered excellent protection for quail."

—*Rupert E. West*
*March 1938*

Readers may be surprised to learn that many of the issues which face us today also troubled our fathers and grandfathers. Sportsmen of the 1930s, for example, were deeply concerned about declines in small game populations. In fact, in July 1937 field biologists with the Department of Conservation and Development kicked off the new "farm game management program." By the end of that year, 234 cooperating farmers were enrolled and farm game plans had been prepared for over 90,000 acres. An article published in the July 1938 issue describes the problem well.

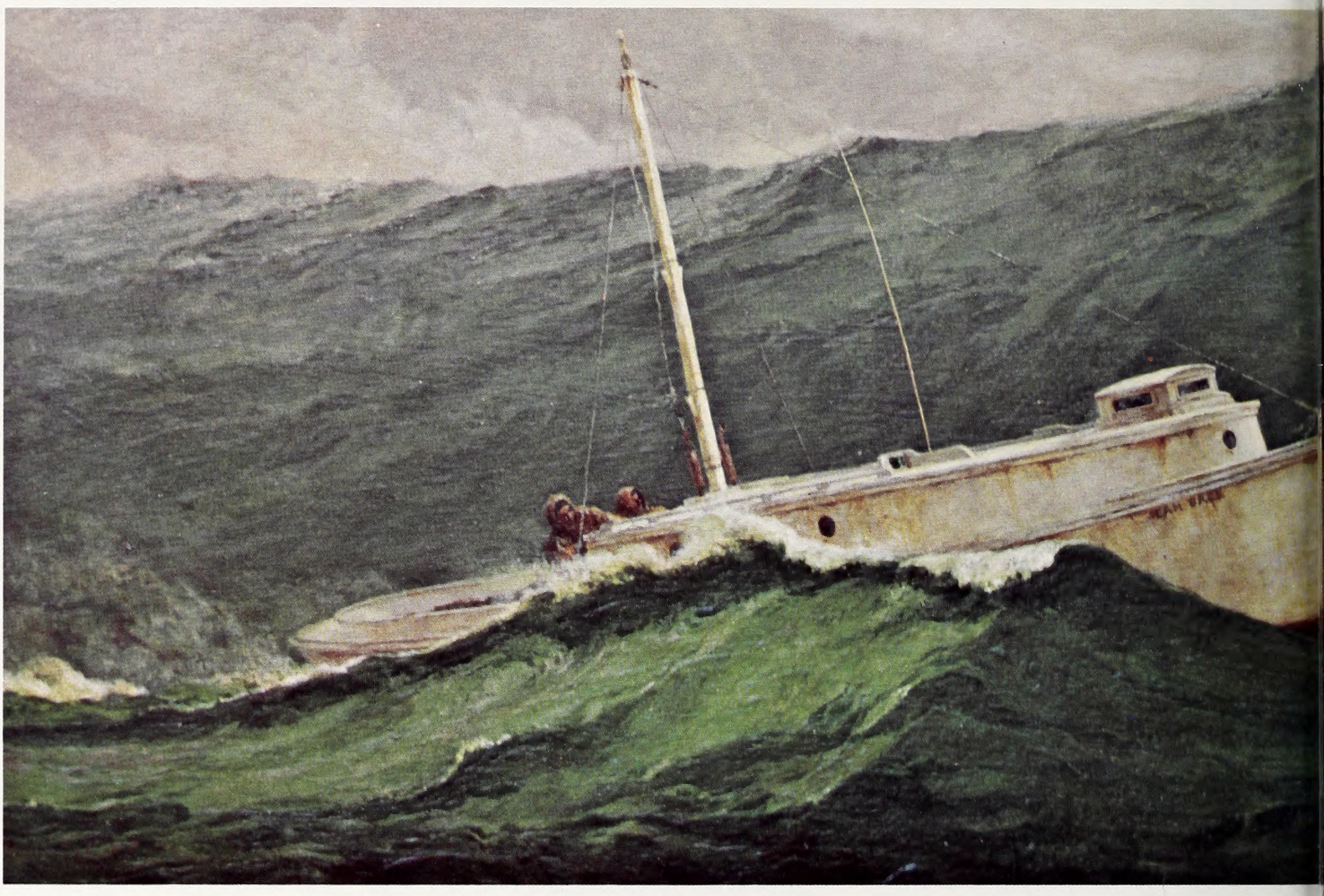
"The modern farmer using tractors and farm machinery tries to utilize every available foot of acreage on his farm," Rupert West wrote, "therefore, we do not have the wide hedgerows that once were numerous and offered excellent protection for quail."

Other causes for the decline were attributed to an ever-increasing number of automobiles, overshooting, repeating shotguns, and "game hogs."

While the overall tone of *Wildlife Management In North Carolina* was serious, reports from the field provided some levity. For example, in the July 1938 issue game warden John Weller of the Pisgah National Forest included two unusual catches in his annual report. His deer traps had captured "two young ladies from a nearby town who could not resist the lure of forbidden fruit" (apples were used for bait) and a "sadder but wiser deer hunter who wanted to see what the inside of a deer trap looked like." This early Pisgah National Forest was the old Vanderbilt estate, and the deer that Weller live-trapped were used to reestablish herds in other parts of North Carolina and on national forests in other states.

Wildlife violations were also as big a problem then as now, and some of the sentences handed out by judges were certainly deterrents. In 1940, for example, dynamiting fish in the Swannanoa River earned four young men from Black Mountain six months of "road work." On other occasions, justice was less formal. The April 1939 issue reports that Lee County game warden Ralph Hamilton was in a filling station on his day off when he heard an 18-year-old-man voice at length his opinion that "all the local game wardens hunt out of

*Bobwhite Quail / Duane Raver / February, 1982*



season." The boy wilted when he learned who was in his audience. A prompt invitation to take a ride and repeat these slanders to the other game wardens in question produced further wilting. Like a benevolent Judge Roy Bean, Hamilton decided to dispense justice on the spot and sentenced the lad to a year in Sunday school. Furthermore, the Sunday school teacher agreed to act as "parole officer" and send Hamilton weekly progress reports. The sentence was carried out to Warden Hamilton's satisfaction.

*Wildlife Management In North Carolina* continued to be published during World War II, although many of the biologists who served as editors left for the service. During the war, some people advocated that all game and fish regulations be repealed and these resources be used to help feed and clothe the nation. Furbearing animals were under particular pressure. Fur sources in Europe and Russia had been cut off, and the Army desperately needed fur for cold-weather clothing. As food rationing grew more stringent, even muskrat carcasses were shipped by the carload to northern cities and sold as "marsh rabbits."

While expressing full support for the war effort, the magazine urged that conservation of our natural resources continue. Articles published in 1943 pointed out that abandoning conservation, even in the face of wartime needs, was shortsighted. One article recalled the damage that overgrazing and overcutting had caused on our public lands in World War I, abuse that contributed to the Dust Bowl. Another pointed out that hunting and fishing provided exhausted defense workers with wholesome alternatives to taverns, and "fit men build good bombers."

Good hunting and fishing stories also weren't neglected, although some ranged farther afield than normal. An article on "Trout Fishing In Normandy" by Private Jack Dermid—more recently of Wilmington—reported that many soldiers were wetting lines in French streams only a few days after the beachheads were secured in the D-Day invasion.

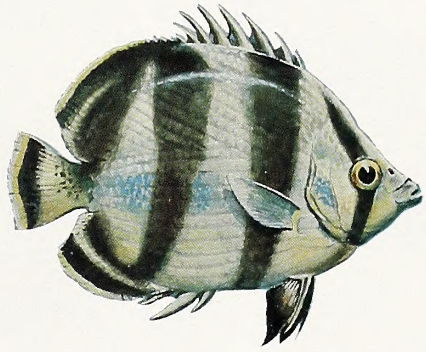
Toward the end of the war, publication of *Wildlife Management In North Carolina* became erratic—probably because of

*Baiting Up / Bob Herr / August, 1984*

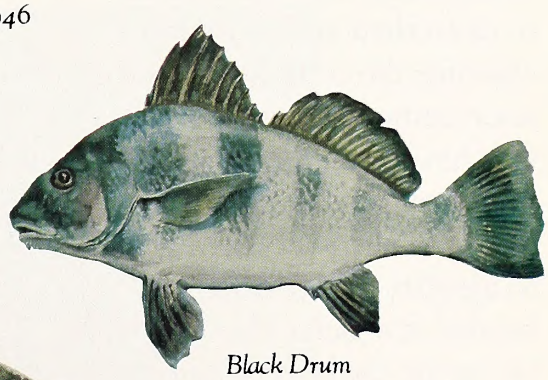
*The Jean Dale / Bob Dance / July, 1979*

"Use DDT in fields and forests cautiously. The U. S. Fish and Wildlife Service says damage to various kinds of animal life, especially to commercially valuable resources such as fish and crabs, is likely to be widespread and severe unless the spraying of the insecticide is restricted to the lowest concentration useful in insect control."

*—(Unsigned)*
*July 1946*



*Banded Butterfly Fish*



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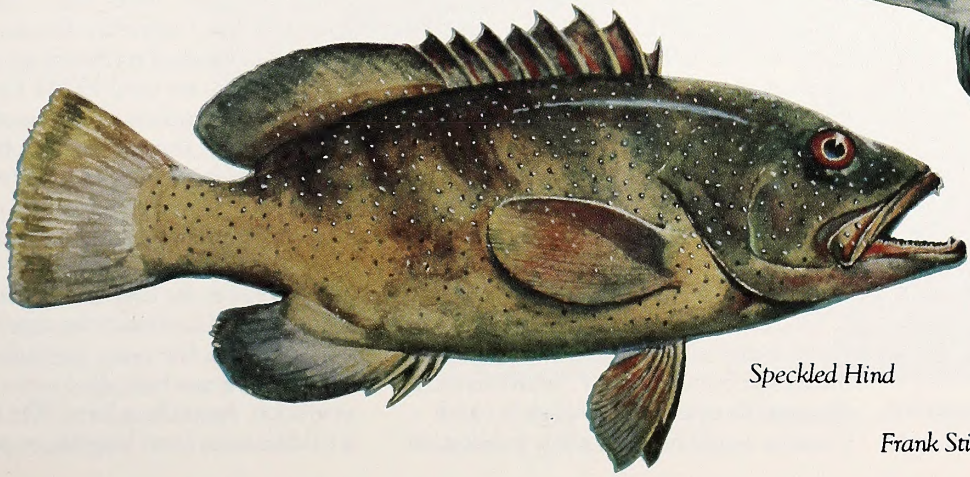


*Speckled Hind*

*Frank Stick / September, 1981*

*Late Afternoon/Larry Barton/March, 1983*

"If every hunter who habitually kills hawks during his trips afield would take the trouble to open their stomachs and examine the contents, he would soon come to the conclusion that hawks are not the vicious killers of game he thought they were. He needn't be an expert to identify the contents of hawks' stomachs. He can recognize the bones and hair of the small animals the birds have eaten. He will find so little material from game birds that he will begin to doubt seriously that hawks are as bad as he had believed."

*—Rod Amundson*
*April 1950*

manpower and paper shortages. The last issue was printed without notice in August 1945.

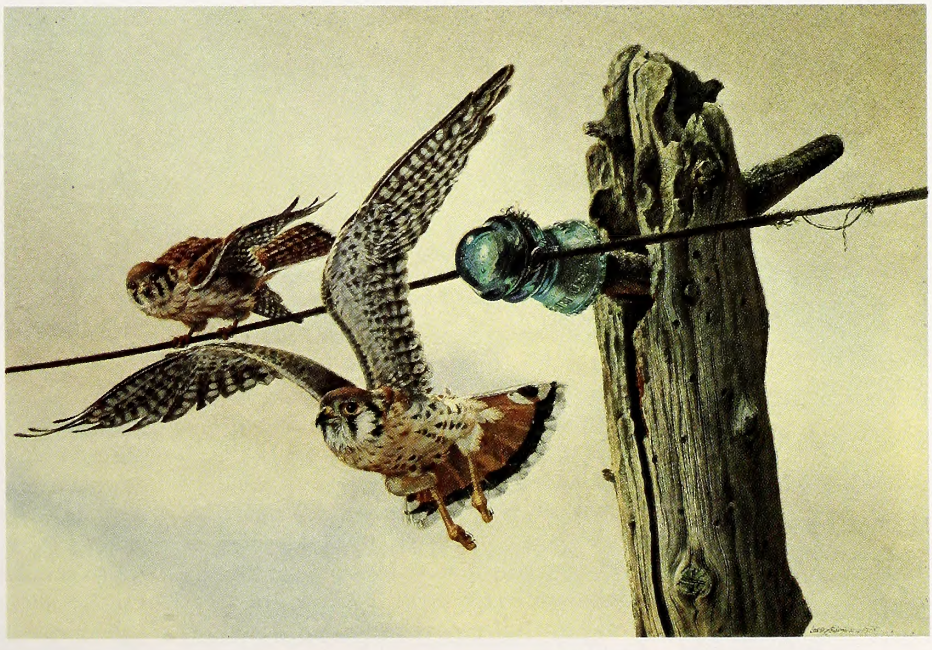
The first *Wildlife In North Carolina* magazine was issued in May of 1946, and complimentary copies were sent to all former subscribers of *Wildlife Management In North Carolina*. In addition to the name change, the size of the magazine was increased to its current format. Henceforth, however, a quarterly subscription would cost 50 cents a year. Paid circulation started with the July 1946 issue. The lead article was "The Pollution Problem," which focused on industrial fish kills and urged that standards be adopted to protect our waters. Many articles on water pollution would follow before the Clean Water Act was finally passed in 1968. The second article in this issue was "The Dangers of DDT, which appeared a full 16 years before Rachel Carson's *Silent Spring* was published , and 27 years before the chemical was banned.

The formation of the Wildlife Resources Commission as an independent agency was the lead story in July 1947. With this came the announcement that *Wildlife In North Carolina* would begin monthly publication in September, 1947. Soon after, Rod Amundson came aboard as the first full-time editor.

"I was hired in 1948 sight-unseen from a similar job with the Nebraska Game and Parks Commission," said Amundson, who retired in 1975 and lives in Raleigh. "Clyde Patton, who as a field biologist had edited *Wildlife Management In North Carolina* before serving in World War II, had recently been appointed executive director of the Wildlife Commission (Patton served as executive director until 1976). He felt the magazine was important, and wanted it to be successful. My first day on the job, I walked in and there was a stack of 1,000 magazines left over from the month before when only 1,700 were printed. Ten years later we reached our peak circulation of 125,000, and were second only to the *Charlotte Observer* as the largest publication in the state.

For the first few years, publishing the magazine was basically a two-man operation. Amundson hired Win Donat, a wildlife artist from Virginia, to paint

*Out Of Reach / Chet Reneson / December 1983*



*Kestrels / Larry Barton / March, 1983*

*Bass And Bluegills / Duane Raver / February, 1982*

"How many income and expense statements in our land show fully on the expense side an amount equal to the destruction the companies are causing to the environment? Very few, if any. If an industry destroys the fish of a river, how much has it destroyed? Suppose the fish catch were only $10,000 per year, and the pulp mill which killed the river had a tax base of $10,000,000. The river seems to compare unfavorably. But consider that the river might last 10,000 years. What then?"

*—James Wallace*
*June 1967*

magazine covers. "Other Wildlife Commission employees provided some articles, and I wrote and edited most of the copy," says Amundson. "Since so little had been done before, we couldn't do much but improve. The biggest mistake I ever made, though, was announcing that we'd publish poetry. We were swamped, and most of it was pretty bad. So, we set a policy that we wouldn't accept poetry." The policy is still in effect.

In the 1950s, two names appeared which would become synonymous with the magazine in later years—Duane Raver and Jack Dermid. Duane Raver came from Iowa in 1950 to work for the Wildlife Commission as a fisheries biologist. Amundson soon learned, however, that Raver was a talented wildlife artist. While working as a biologist, Raver contributed covers, artwork, and stories to the magazine. In 1960, he transferred to the magazine staff, serving as managing editor and later editor until he retired in 1979. He now works as a full-time wildlife artist from his home in Cary.

Jack Dermid studied wildlife management at N. C. State after he mustered out of the Army, and in 1950 joined the magazine as a photographer. Using a large, cumbersome Speedgraphic camera and an electronic remote control—"long lenses weren't available then," he says— he exposed thousands of negatives that today still form a treasured part of *Wildlife*'s photo files. In 1962 he left the Commission to take a teaching job in the biology department at

*Backwater At Pamlico/Bob Herr/ August, 1984*

UNC-Wilmington. He retired from teaching last year, and is working on a book for the University of North Carolina Press on the natural history of the Outer Banks.

"There weren't many state wildlife magazines in the 1950s and 1960s, and the whole field of conservation education was relatively new," Raver recently recalled. "The first really professional state wildlife magazine was the *New York Conservationist*, which is still excellent. They set the standards for the rest of us to follow. In North Carolina we had a small budget and staff, and were stretched pretty thin. In addition to publishing the magazine we also presented wildlife programs to schools and other groups, produced weekly radio and television shows, and promoted boating safety. Everyone wore lots of hats, and you never knew from one day to the next what you'd be doing. There were many occasions, for example, when I would paint a cover for the magazine only a day or two before it was due at the printer.

"Many of the issues we addressed in the magazine 30 years ago still remain," Raver added. "Fish kills were a big problem, and we hammered away on water pollution for years. Some things that are taken for granted now, such as trout stocking and either-sex

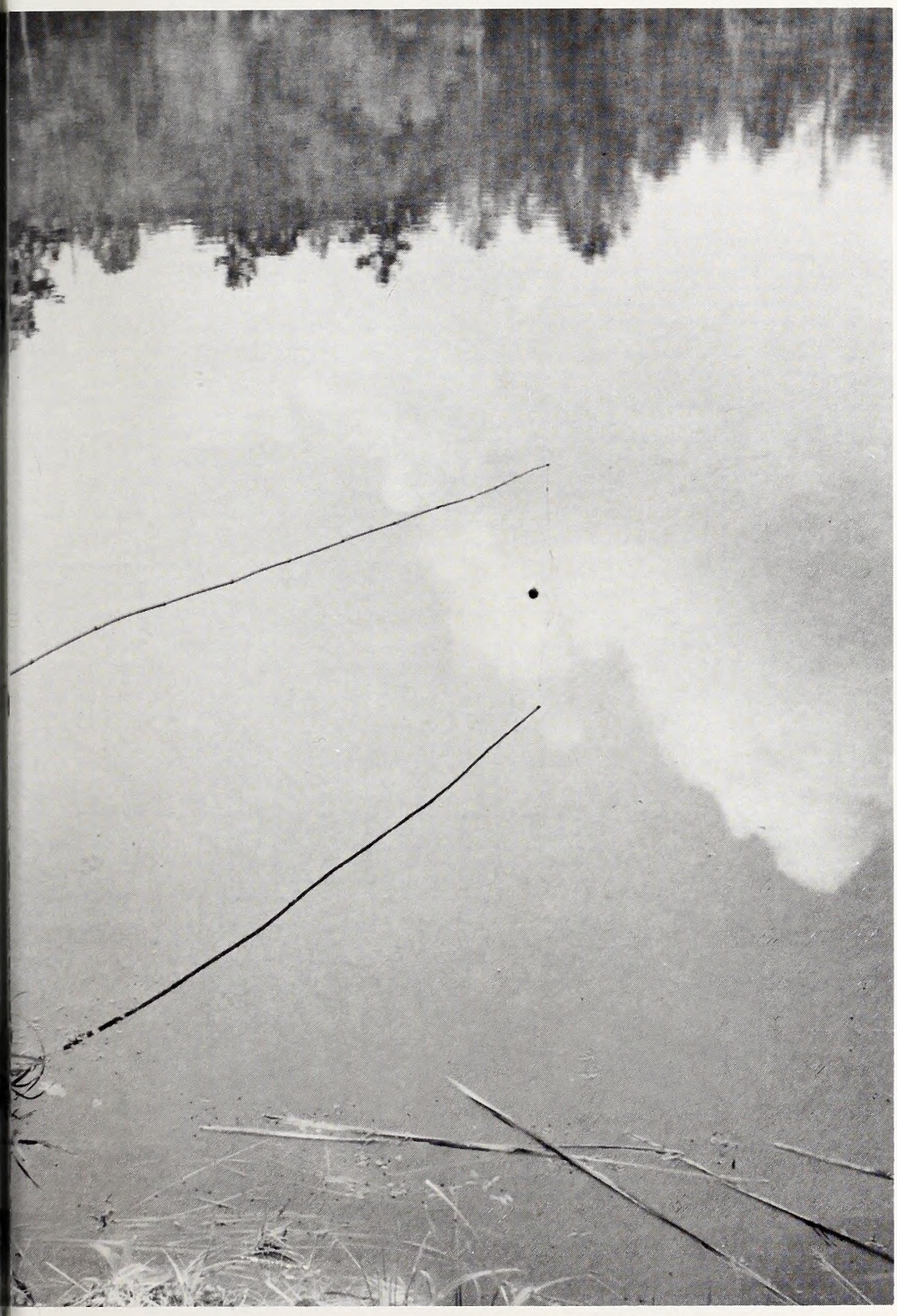
*Rainbow Trout / Jack Dermid / June, 1953*

"Of the 47,000 acres which the U. S. Government acquired in connection with the B. Everett Jordan Dam project, perhaps half are alluvial bottomlands . . . These alluvial forests host birds, mammals, reptiles and amphibians who dwell nowhere else . . . They just can't go to similar habitats on other rivers . . . The hard fact now emerging from biological research is that when a habitat is destroyed, everything in it dies."

*—Michael Godfrey*
*November 1978*

*Least Bittern / Jack Dermid / April, 1955*

deer hunts, were very controversial. One of the differences is that we didn't focus on habitat destruction very often because North Carolina was still a rural state. There wasn't the urban sprawl and coastal development you see now. This changed by the late '60s, and we began publishing stories on the draining and clearing of wetlands, development of barrier islands such as Baldhead Island in the lower Cape Fear, channelization, and the loss of trout streams to highway development



*Boy With Cane Pole/Jack Dermid/October, 1951*

> "Is the crisis in habitat something that individuals can do something about? Or are solutions to be left to governments and administered by the public servants of our natural resource agencies? We hope we have indicated that individuals and governments have equal responsibilities but we have put special stress in this series on the individual landowner. For we have seen that it is on the solitary decisions made by the small landowners that the future of wildlife habitat in North Carolina rests."
>
> —*Lawrence S. Earley*
> *August 1985*

and mining."

The last major change in *Wildlife In North Carolina* magazine occured in the fall of 1977 when the Division of Conservation Education, which publishes the magazine, expanded. A full-time art director, chief photographer, assistant editor and news director, and education field representatives for the Mountains, Piedmont and Coastal Plain were hired. In July 1979, Raver retired and staff writer and assistant editor, Jim Dean, was named editor.

"While Duane was still here, and with the added help of our new staff members, we worked out a new format for the magazine in January 1978," said Dean. "Duane had been putting the magazine together virtually single-handedly, and he did a terrific job. When several of us took over, we often wondered how in the world he'd managed to do it. The increased use of color in recent years has certainly been popular, but I guess we're most proud of the fact that we've been able to publish dozens of articles on such important issues as acid rain, hazardous waste, the destruction of wildlife habitat, water pollution, mining and so forth. We've had excellent support from the Wildlife Commission, and we'd like to think we've helped the agency and given it wider recognition for its work.

"We also appreciate all the nice letters and notes we get from readers who like the magazine, and even when we get a letter with a criticism or suggestion, we often find it helpful because we know it comes from people who care," said Dean. "We've become part of a big wildlife family here in North Carolina, and the magazine is sort of like a monthly report on the status of the ol' homestead."

Are there any big changes in store for *Wildlife In North Carolina* for the future?

"Well, it's difficult to predict what may happen during the next 50 years, and how the magazine will respond to those changes, but I feel confident that those who take over down the road will find more and better ways to represent the North Carolina Wildlife Resources Commission, and take care of the many wildlife resources we've been blessed with," said Dean. "One hope all of us here have is that those who don't hunt and fish and those who do will increasingly realize that both sides seek the same goal—a sound future for all wildlife—and work together to make certain our kids can enjoy all the things that were passed down to us." ⊠

# The Lure And Lore Of Lures

## You can chart the history of bass fishing through the colorful bass plugs made by lure companies since the turn of the century.

written and photographed
by Jim Dean

It is likely that every serious bass fisherman has heard some variation on the story of how the first wooden bass fishing plug originated. Sometime around 1890, James Heddon of Dowagiac, Michigan, was waiting beside a lake for a fishing buddy to show up. To kill time, he whittled on a chunk of wood, then casually tossed it into the water. A largemouth bass struck at the chunk, and it occurred to Heddon that he might be able to catch bass if he attached hooks to a carved piece of wood that could be cast with a rod and reel.

Heddon's son, Charles, recalled later that his father began carving and using wooden bass plugs and gave a few of them to friends and family members. About 1901, Heddon began making and selling wooden bass plugs commercially.

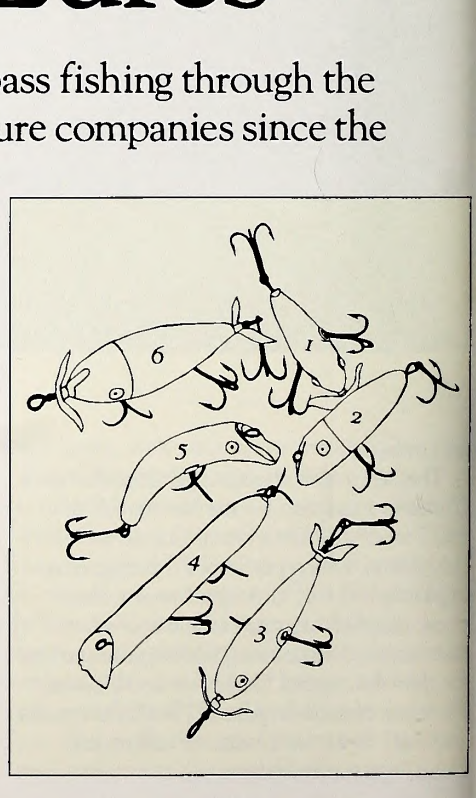
The bass plug was an almost instant success, and its popularity spread rapidly during the following decade. Actually, the development of bass plugs—the term plug has evolved generally to describe any artificial bait made of wood or plastic—was almost inevitable given the pugnacious nature of bass and the prior existence of rods and reels that could cast them. Good revolving spool-casting reels had been around since at least 1800, and those developed by Kentucky watchmakers were especially well-made. Fitted with rods made of hickory, lancewood, greenheart or Calcutta cane, and even steel, these reels were usually used to cast natural baits or flies. Adapting such tackle to cast the new wooden plugs was relatively simple. Plug casting weathered the widespread disgust of "purists" such as Dr. James A. Henshall, the acknowledged father of bass fishing, and quickly began to make inroads on the more popular natural bait- and fly-casting methods.

The new wooden plugs were by no means the first artificial bait-casting lures, since metal spinners, spoons and other artificial lures had been in use since the mid- to late-1800s. Indeed, there remains some doubt that James Heddon was actually the first to develop wooden plugs, but no one argues the fact that he popularized them.

The success of Heddon's plugs quickly spawned many other commercial lure companies, some of them still in business today, and almost all of them familiar to any bass fisherman who grew up during the glory days of bait-casting earlier in this century. Heddon, Creek Chub, Pflueger, South Bend and Shakespeare are by far the best-known of the classic bass plug companies, but there are dozens of smaller companies which have contributed significant improvements during the years since 1901. There are millions of bass plugs in tackle boxes throughout the country, and even some of the earliest styles of lures proved so popular that they have been in continual production for 75 years.

My interest in these bits of bass-fishing memorabilia began in 1968 when my grandfather died and left me his tackle. His old wooden lures were hardly unique—a few Creek Chub crippled minnows, a pikie minnow or two, and a couple of Heddon Vamps and Lucky 13s, and a Pflueger Globe—but they reminded me of all the good times we'd shared on countless millpond fishing trips, and over the years, I've added others to a rather haphazard collection of memories.

Actually, much of the history of fishing can be traced through various lures and manufacturers, and if you learn nothing else, you soon realize that inside the mind of each angler lies a fine inventive madness. Ever since Heddon tossed out that first chunk of wood, fishermen have been tinkering with lure designs, hoping to come up with the one surefire bass plug that would outfish all the others. This has led to some bizarre adaptations.




***South Bend*** *is one of several major lure manufacturers that had its heyday during the glory days of bass fishing the first half of this century, and these lures are a few of the old favorites made by this company.*

*1—Midget 901 Underwater Minnow; 2—baby Bass Oreno (one of the most popular of all bass lures, and still available in plastic); 3—904 three-hook underwater minnow; 4—early Pike Oreno; 5—Tease-Oreno; and 6—Surf Oreno (a surface lure).*

SOUTH BEND
QUALITY TACKLE
THE GENUINE
SOUTH BEND MINNOW
FOR GAME FISH
MANUFACTURED EXCLUSIVELY BY
SOUTH BEND BAIT COMPANY
OF THE FAMOUS SOUTH BEND ANTI-BACK-LASH REEL
SOUTH BEND, INDIANA
SOUTH BEND BAIT COMPANY
SOUTH BEND, INDIANA

"There are millions of bass plugs in tackle boxes throughout the country, and even some of the earliest styles of lures proved so popular that they have been in continual production for 75 years."

Early patent records are full of Rube Goldberg contraptions that were mechanical nightmares. Some had tiny gears and transmissions linked to propellers to make them "swim." Others had legs that kicked, fins that flapped and tails that wagged. A few were equipped with tiny interior electric lights, and many had luminous paint that glowed in the dark. One company, Bleeding Bait Manufacturing Co., provided dissolving capsules of blood-colored attractant that could be inserted into a hole in the lure. Many lures had as many as five, sometimes six, treble hooks to ensure that any bass, muskie or other gamefish that made a misjudgment would not escape.

Not surprisingly, the most effective bass plugs have been based on fairly simple designs, and many of these are still in use virtually unchanged today. Heddon and others learned early that one or two propellers mounted fore and aft on a lure would attract strikes, and some early plugs—sinking models— employed a prop. Heddon's most popular floating plug from that early period is a fairly simple, round-bodied wooden plug called the Dowagiac Expert. It had a metal collar which disturbed the water when it was twitched. Heddon also made floating-diving plugs fairly early—a diving wiggler in 1916, and the more popular crab wiggler in 1919.

Of all the many Heddon plugs, however, the all-time favorite may be the Lucky 13—a simple wooden cylinder with a concave face—which first appeared in 1920. Still available in plastic, it's a floater that can be chugged as a surface lure, or retrieved more quickly in an erratic manner so that it dives and wobbles. Introduced a year later in 1921, the Vamp, with a metal lip, is another popular floating-diving Heddon that has endured to present. In 1929, the River Runt divers hit the market, and for many years, no self-respecting bait-caster would have been caught dead without a few of them.

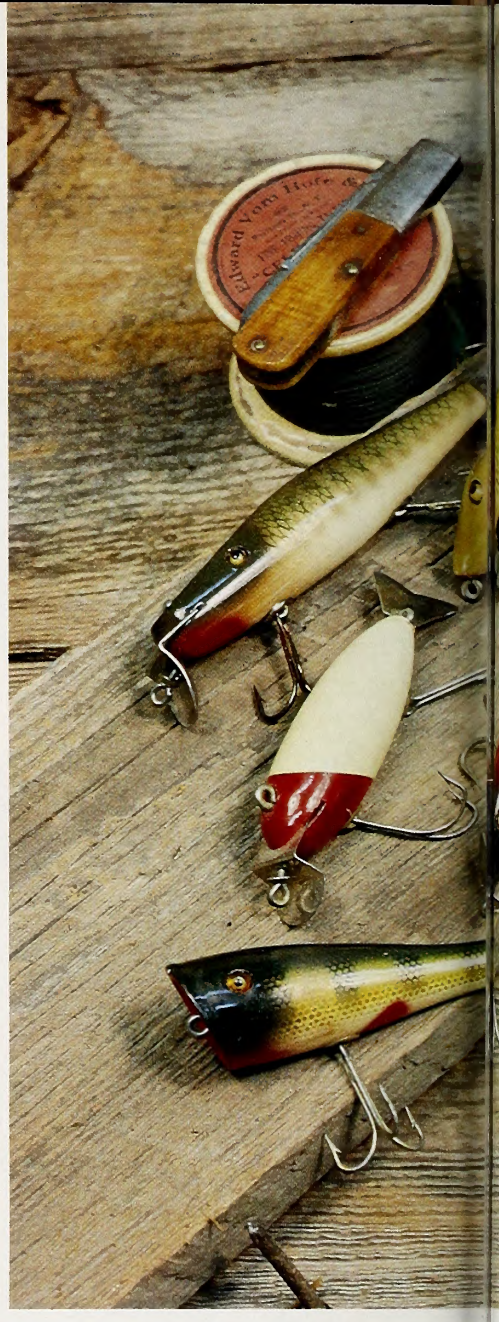
Though most of Heddon's lures are now made of plastic, the new series of Timber Rattler crankbaits made of cedar and sporting glass eyes are a throwback to the old traditions. Many older lures, and especially those made by major companies like Heddon, were carefully crafted. I have one paint-chipped Heddon 100—a double-spinnered underwater minnow with three treble hooks—that has eight coats of paint on it.

The Creek Chub Bait Company of Garrett, Indiana, has also made many millions of plugs since it first began doing business about 1916, possibly earlier, and this manufacturer developed the natural scale finish so prevalent on bass plugs. The scale appearance was achieved by spraying a contrasting color of paint through netting which had been stretched against the side of the plug.

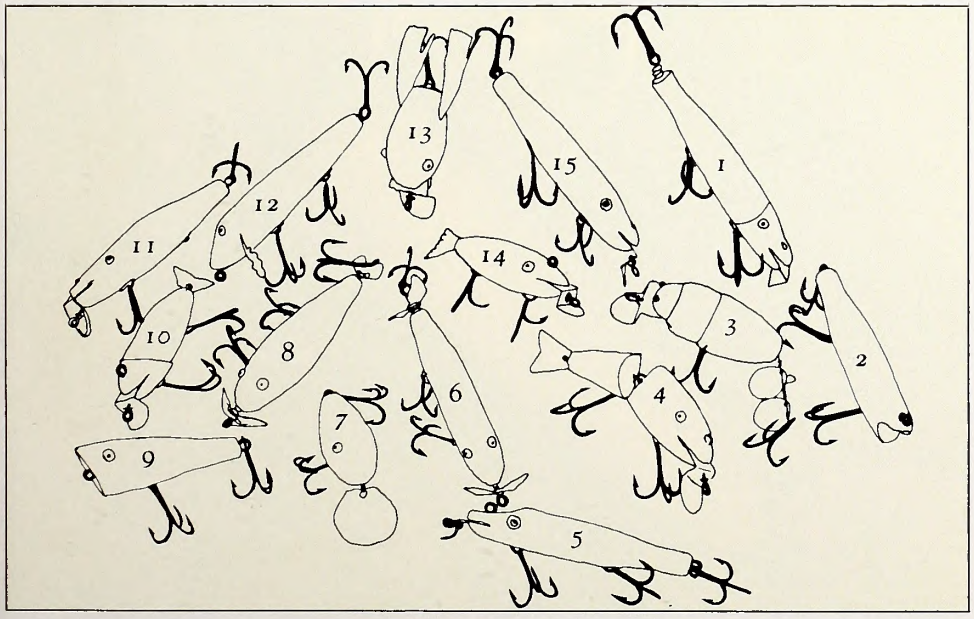
Creek Chub's first plug was the 100 Wiggler and it had a metal lip that could be reversed so that the plug could be fished entirely on the surface, or as a float-diving lure. A similar style of lip is found on many Creek Chub baits, including the well-known pikie minnow series. The first pikies appeared about 1920, and have been in constant production ever since, although plastic was substituted for wood sometime in the 1960s. Production figures are not always reliable, but it's a good bet that more pikies have been made than any other single bass plug.

Other Creek Chub favorites over the years have been the floating injured minnows with twin fore and aft spinners, the surface plunkers, and the darters. As evidence that some of these older lures still work, I landed a 9½-pound largemouth bass on a Creek Chub-spinnered darter in a farm pond one spring morning a few years ago. I should add, however, that many of these older lures lack the lively action present in modern plastic and balsa baits, although heavier wooden plugs were often easier to cast.

William Shakespeare, Jr. of Kalamazoo, Michigan (no kin, apparently, to the English

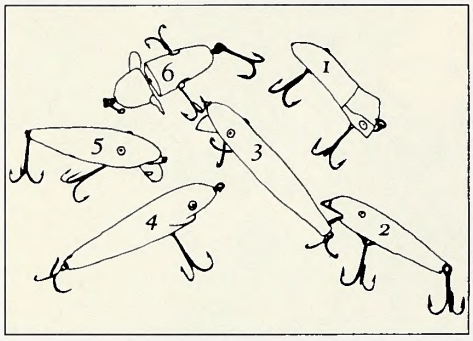


***Resting on a** later edition of Izaak Walton's* The Compleat Angler, *these two old classic Creek Chubs postdate the father of angling by some 275 years. The top lure is a Deluxe Wagtail Chub, and below it is a similar lure called a Wigglefish. A Wigglefish is reported to have landed the world record 22-pound, 4 ounce largemouth bass caught in 1932 by George Perry in Montgomery Lake, Georgia.*




***Beginning about 1916,*** *Creek Chub made a wide variety of lures and would even paint them to customer specifications upon request. As is the case with other major companies, some of these lures are still made today in plastic.*

*1—large Pikie Minnow; 2—Darter; 3—Beetle; 4—Wigglefish; 5—standard Pikie Minnow; 6—Crippled Minnow (popular surface lure); 7—Flip-Flap; 8—Crippled Minnow; 9—Plunker; 10—Deluxe Wagtail Chub; 11—Surfster; 12—Sucker Minnow; 13—Dingbat; 14—Deluxe Wagtail Chub; 15—Pikie Minnow.*

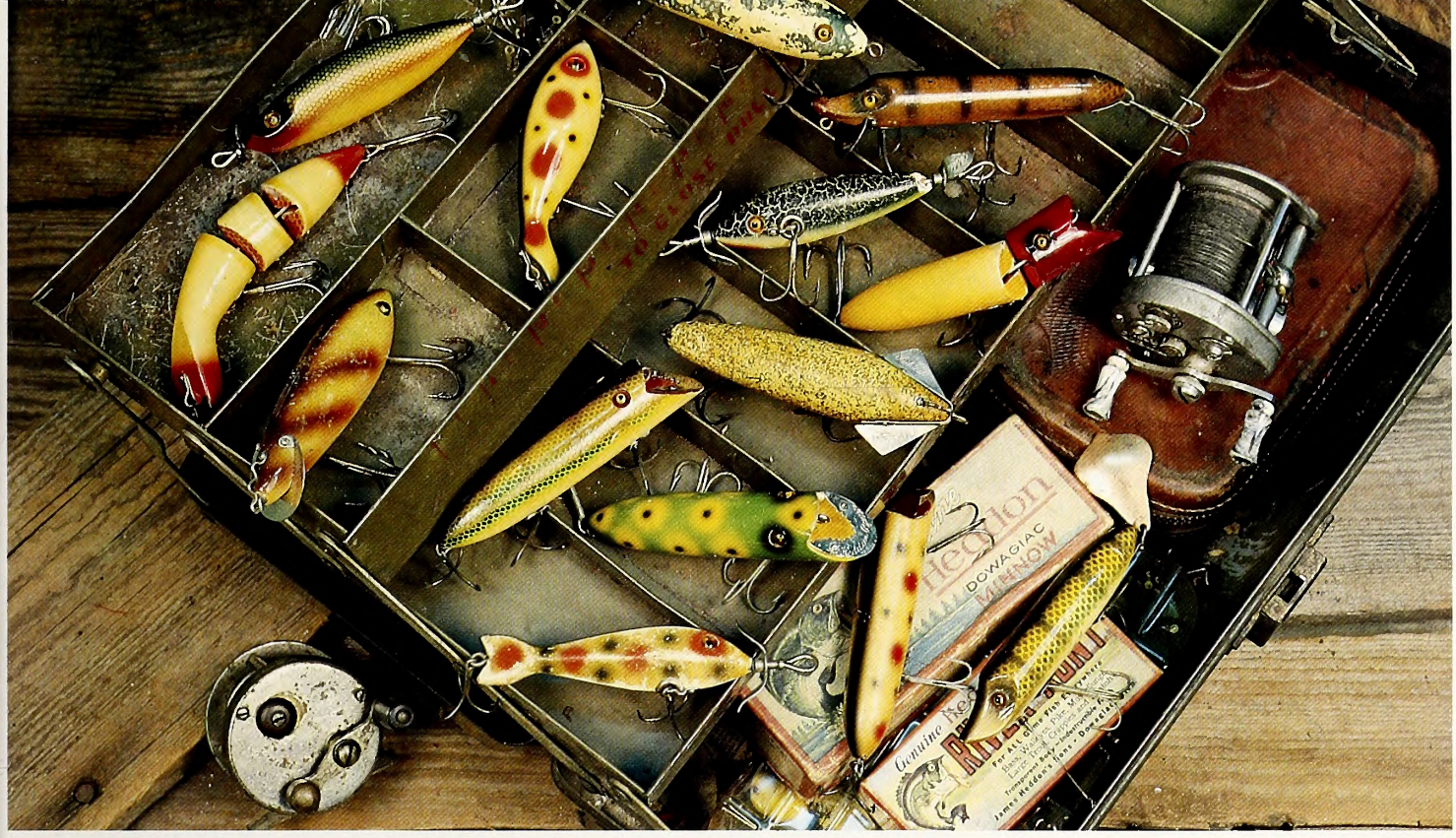


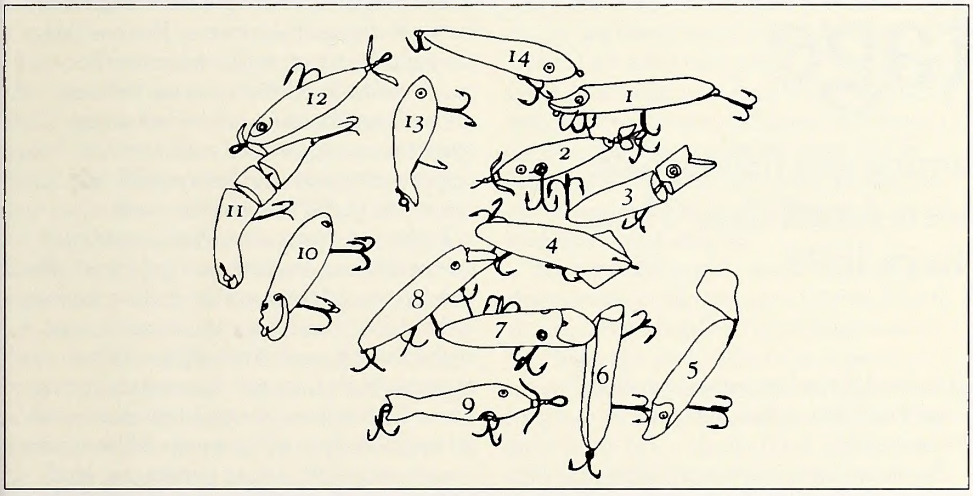

***Pflueger was making*** *fishing lures of metal in the late 1800s under several brand names, and may be the oldest of the major manufacturers. This company's wooden lures began appearing about 1900.*

*1—Wizzard; 2—Pal-O-Mine; 3—large, older Pal-O-Mine; 4—Surprise Minnow: 5—O'Boy; 6—Globe. The Globe, a surface lure with a revolving head, is one of the most familiar of the many Pflueger lures although other companies had similar lures.*

***These two classic*** *Heddon bass lures were made about World War I, perhaps a few years earlier. This early underwater 150 Dowagiac Minnow (top) sported five treble hooks, and similar lures were made throughout the years until the early 1960s. This Heddon 200 (below) is very similar to the Dowagiac Expert or Slopenose, the earliest commercial lure Heddon introduced shortly after the turn of the century.*

author) was making fishing tackle in the late 1800s, but patented his first bass plug called the Revolution in 1901—a strange-looking lure made first in wood, but soon converted to hollow aluminum. The colors and finishes on many Shakespeare lures were especially attractive, and some early lures featured even scales and fins almost as realistic as the photo-printed finishes on modern plastic lures. The Shakespeare company was absorbed by Creek Chub in the early 1950s, but the company made so many lures that most are still fairly common.




***Heddon bass lures*** *may be the best-known, and certainly among the most popular, of all bass lures, and this company made many different kinds of high-quality lures.*

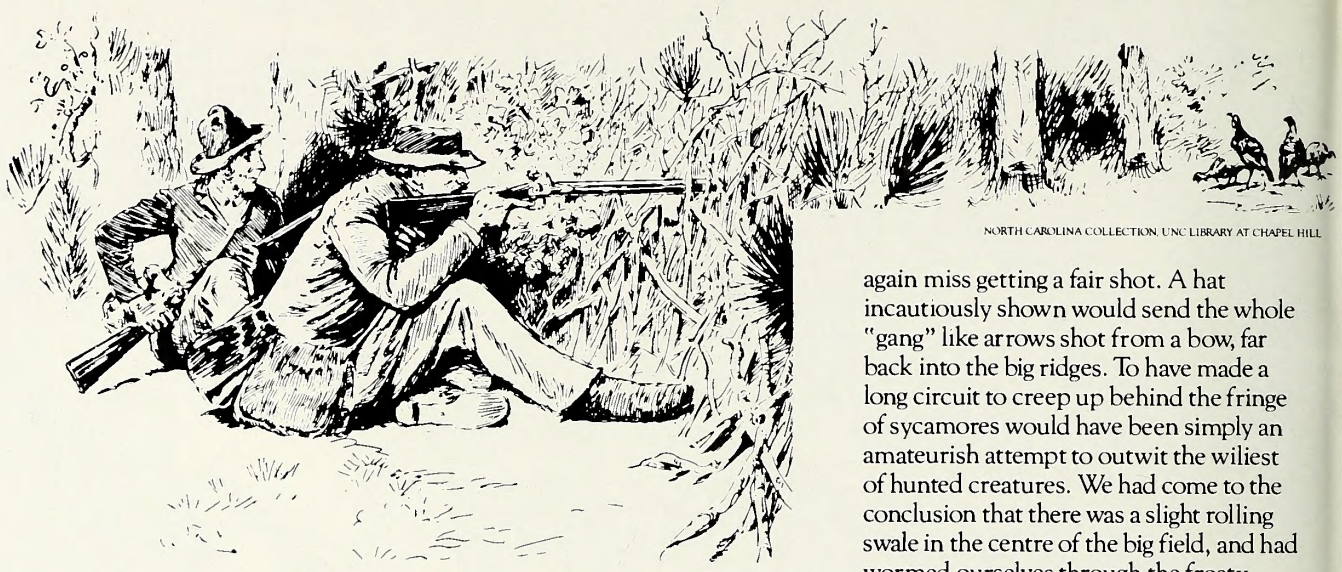
*1—Vamp; 1—100 Dowagiac Minnow; 3—Zig-Wag; 4—1600 Wiggler; 5—Flaptail; 6—Lucky 13; 7—Basser; 8—another Basser; 9—Florida Special; 10—Crab Wiggler; 11—Gamefisher; 12—SOS (stands for Swims On Surface); 13—Tadpolly; 14—Zaragossa. The Zaragossa is a surface lure said to have been named after Zaragossa Street in Pensacola, Florida, where years ago certain young ladies were said to wiggle enticingly as they walked past the air base. Whether true or not, the Zaragossa's wiggle has certainly enticed a few bass.*

Although Heddon generally is accorded credit as the first manufacturer of bass plugs, there are some who believe Pflueger Fishing Tackle Company more appropriately deserves that honor. E. F. Pflueger was manufacturing fishing tackle as early as 1864 under several brands, and one early metal-winged lure with a small wooden body called the Flying Hellgramite is known to have Pflueger connections as early as 1885. Production of wooden minnow imitations and other plugs began about 1900, and many a largemouth has met its match at the hands of a Pflueger Neverfail minnow, Globe, Surprise or Pal-O-Mine.

Like most of the other major plug manufacturers, South Bend had its origin in the upper midwest. Production began in South Bend, Indiana, in the early 1900s when F. G. Worden hand made spinnered underwater minnows, but within a few years, his operation had evolved into the South Bend Bait Company. One of the best-known of all bass lures is the Bass Oreno, a scoop-nosed floating-diving plug first made in 1915. If any plug rivals the Creek Chub pikie minnow in overall numbers, it would probably be the Bass Oreno and its variations.

Although these companies are perhaps the largest and best-known of the bass plug manufacturers, they are by no means the only ones. Any complete list of manufacturers might well be impossible, and there were many other sizable companies including Paw Paw, Moonlight, Decker, Jamison, Eger, Al Foss, Wilson and Rush. Countless smaller outfits, some that were little more than Mom and Pop (mostly Pop) operations constructed mostly handmade products in the family garage.

Unlike many interesting and colorful items of sporting memorabilia—old decoys and classic guns come to mind—most old fishing plugs are rather common because so many were made. You may never own a Ward canvasback decoy or a 20-gauge Parker shotgun, but a bass plug from the same era is probably as near as your dad's tacklebox. ⊠



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# Our Sporting Heritage

North Carolina's prime hunting and fishing have been topics for writers since colonial days. These excerpts date from 1894.

*What's a birthday party without a story or two?* Wildlife In North Carolina *has been regaling its readers with hunting and fishing stories for 50 years, but the form is a lot older. The hard-working Adam probably didn't see much point in going on about the one that got away, but some of his leisured descendants no doubt enjoyed the pleasures of the chase. The first fishing lie quickly followed, according to reputable scholars.*

*Since then, that aristocratic literary trickle has become a democratic flood in the United States. With its impressive variety of habitats, North Carolina has provided food and sport for hunters and fishermen for as long as man has lived here. Tar heel sporting exploits have appeared in a host of magazines and books since the middle of the last century.*

*What follows is a sampler of some of those hunting and fishing stories. These five excerpts are set in North Carolina, and all appeared in print between 1894 and 1947. Some of their authors were famous in their day, while others were not. All share an enthusiasm for the hunting and fishing that distinguish the Tar Heel state.*

*For the armchair sportsmen among us, enjoy!*

## Death of the Patriarch

We had crawled on our hands and knees out of (a ridge,) a quarter of a mile behind, where we had lain in ambush since the break of day, and then, as the sun metamorphosed into jewels the millions of dewdrops on the broad mountain pasture, we had seen a dozen dark forms glide down from the fastnesses of (the next ridge) and move in an industrious procession through the low-lying stubble near the river.

Twelve full-grown turkeys had flown from the mountain to feed within a few hundred yards of us, in absolutely open ground; but we had not climbed the mountains after them for five days without knowing that to all intents and purposes they were safe, and that we should probably again miss getting a fair shot. A hat incautiously shown would send the whole "gang" like arrows shot from a bow, far back into the big ridges. To have made a long circuit to creep up behind the fringe of sycamores would have been simply an amateurish attempt to outwit the wiliest of hunted creatures. We had come to the conclusion that there was a slight rolling swale in the centre of the big field, and had wormed ourselves through the frosty stubble and dewberry bushes to the last safe point by the comfortable process of lying prone on the ground and pushing along with one leg. Three hundred yards of this supine progress had left us with hands entirely too numb to feel the prick of the briars in them, with muddy guns, and, worst of all, with three gunshot lengths still between us and the turkeys. There we lay, now and then peeping hatless over the gently rising knoll. Never in my hunting career have I been in a more tantalizing situation, nor have I had such another opportunity to study the home life of one of the shyest birds in the world.

Eight were hens, scarcely one-third the size of the four magnificent "gobblers" who every now and then paused in their feeding to hold their heads high up, in statuesque suspicion, on general principles. What majestic birds they are! As one straightens himself proudly up in rigid attention, until he seems fairly as tall as a man, his feminine convoy stop their dainty peckings to lend him their ears, until he is slowly satisfied with the situation, and begins again his keen-eyed search for ragweed seed and last year's wheat, or with a quick low "cur-rt" runs swiftly forward to a fancied bonanza.

Presently, as the rising sun creeps over the field, and reaches their valley too, one of the bearded fellows suddenly ruffles up his whole panoply of dew-brushed feathers to catch the first pure rays, until he "looks as big as a barn," according to Bob's ecstatic whisper; even at this distance we can see the blaze of the bronze and green and gold iridescence on the powerful neck and back. Now two of these dark-tinted champions have a little altercation over a most unmistakable preference shown by a coquettish hen, and their dignity is for the moment entirely lost in a series of awkward, even ridiculous antics preparatory to a

battle, that is cut short by a warning attitude on the part of the patriarch, who has looked on, or rather hasn't looked on, the scuffle with the greatest contempt.

There seemed to be nothing for us to do but to wait and hate ourselves for not bringing rifles instead of shot-guns. We discussed in the sign language the possibilities of making a sudden charge, which might give a faint chance of a wing shot as they made for the river. But we had seen turkeys run and fly before, and we decided that was not even a forlorn hope.

Before long it was evident that the enemy had about finished their breakfast; they moved slowly away from us toward the river-bank. "I wonder if they won't take a drink?" I gesticulated over to Bob, feeling a ray of hope. "If they do, we'll charge," he flashed back. Sure enough, presently they disappeared one by one in the brush along the river. We were on our knees, when suddenly up bobbed the head of the rear-guard, and we flattened out again, to see the whole flock reappear and make their way a few yards down the stream. When this was repeated again and again we were more wary, and finally, after they had been swallowed up about a hundred heart-beats, we jumped on our cramped legs, made the sprint of our lives to the river, plunged through the bush into the sycamores, with eyes straining in every direction, and were rewarded by hearing a rush of powerful wings beating the air as the great birds took to the mountains. Only of the very last one did I catch a glimpse, as he shot down the bend of and across the river with curved wings; a load of buckshot down the bend of and across the river went tearing through the tree-tops in the desperate hope of reaching some point in his orbit about the same time that he did, and a heavy plunge in the river brought me bucking through the under-brush away from Bob's lamentations. The lucky snapshot had stopped a big gobbler in mid-flight, and he was wildly beating the shallows on the farther side of the narrow river. He was the first bird after a week of fruitless hunting, and never did I take an ice-water bath so blithely as in the sortie through the river to capture that turkey. As I fetched him across, held by the great strong legs over my shoulder, his rich feathers ruffled back, and his long neck trailed out behind on the water, Bob certified exultingly from the bank that it was the patriarch.

He was trussed up to a dogwood-tree out of the way of four-footed thieves, and we hunted happily for the rest of the day without a shot.

*from "On The Trail Of The Wild Turkey," by Charles D. Lanier* (Harpers, November 1894).

## Big Bass at Hunnicut's Pond

Until two years ago, Hunnicut's pond, in Harnett County, about 25 miles from Raleigh, was full of bass, jack and perch; but the water had to be turned out to fix the dam, and it is not yet ripe for fishing. It is situated on Black River, which rises near Angier and empties into the Cape Fear River. This is the only pond, with a dam in good order, that interferes with the water in its course to the sea; and game blue bream up to a pound in weight are plentiful, in June, at the mill tail, only a few getting up into the pond. This is the fishiest stream in middle North Carolina.

I had trouble with a seven-pound bass in this pond several years ago. I struck him in the midst of a bunch of logs about twenty feet from the bank, where the water was seven feet deep. It was an ideal place; the logs two or more feet under water, and the fish—that fish—always there and customarily hungry, so that I had no difficulty in enticing him to take a medium sized minnow.

My heart was glad. I had no animosity against game fish. I would rather one would whip me, than eat him. I buy—do not sell—I fish for sport. This time I got my fish hard hooked, but could not clear the logs and he soon succeeded in wrapping himself around a projecting branch deep in water, and got so fast to it that I could not budge him nor would he take up the slack line. In a little while he began to cut up again, and the line parted, having been see-sawed off, a foot below the cork. I knew it was no use trying any more that day. A week afterwards I found him again with nearly the same result, but I worked differently. As soon as he had hung under, and the line was taut and fast, I got out of the boat and went down to the catch, but he had torn off and the hook was hitched to the log. Several days afterwards I hit him again. This time I got him safely over and clear of logs, and while my boy paddled into the open, I felt so sure I had my fish that I neglected to put the tip of the rod to the water, and while playing him the third time around the boat he fairly rose out of the water, and shook my hook out of his mouth much after the way a mean mule would discharge a bit. I was heart broken, did some muttering for a few minutes; and went home. To this day I can see the defiant countenance of that fish, in the air, jerking his head from side to side.

For weeks I pursued him, but never struck him—he either took the minnow off

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or threw it out. A lady caught him, the fish having swallowed the bait and got hooked in the maw. Even then the line broke, and the fish dropped into the boat. He weighed 7¼ pounds, and this is why I know he was a seven-pounder.

*from* Black Bass and Other Fishing in North Carolina, *by A. V. Dockery* (Raleigh 1909).

## A Bear Hunt In The Smokies

It turned very cold that night. The last thing I heard was Matt Hyde protesting to the hunchback:

"Durn you, Bill Cope, you're so cussed crooked a man cain't lay cluss enough to you to keep warm!"

Once when I awoke in the night the beech trees were cracking like rifle-shots from the intense frost.

Next morning John announced that we were going to get another bear.

"Night afore last," he said, "Bill dremp that he seed a lot o' fat meat layin' on the table; an' it done come true. Last night I dremp me one that never was knowed to fail yet. Now you see!"

It did not look like it by evening. We all

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worked hard and endured much—standers as well as drivers—but not a rifle had spoken up to the time when, from my far-off stand, I yearned for a hot supper.

Away down in the rear I heard the snort of a locomotive, one of those cog-wheel affairs that are specially built for mountain climbing. With a steam-loader and three camps of a hundred men each, it was despoiling the Tennessee forest. Slowly, but inexorably, a leviathan was crawling into the wilderness and was soon to consume it.

"All this," I apostrophized, "shall be swept away, tree and plant, beast and fish. Fire will blacken the earth; flood will swallow and spew forth the soil. The simple-hearted native men and women will scatter and disappear. In their stead will come slaves speaking strange tongues, to toil in the darkness under the rocks. Soot will arise, and foul gases; the streams will run murky death. Let me not see it!"

Wearily I plodded back to camp. No one had arrived but "Doc." The old man had been thumped rather severely in yesterday's scrimmage, but complained only of "a touch o' rheumatiz." Just how this disease had left his clothes in tatters he did not explain.

It was late when Matt and Granville came in. The crimson and yellow of sunset had turned to a faultless turquoise, and this to a violet afterglow; then suddenly night rose from the valleys and enveloped us.

About nine o'clock I went out on the Little Chestnut Bald and fired signals, but there was no answer. The last we had known of the drivers was that they had been beyond Thunderhead, six miles of hard travel to the westward. There was fog on the mountain. We did some uneasy speculating. Then Granville and Matt took the lantern and set out for Briar Knob. "Doc" was too stiff for travel, and I, being at that time a stranger in the Smokies, would be of no use hunting amid clouds and darkness. "Doc" and I passed a dreary three hours. Finally, at midnight, my shots were answered, and soon the dogs came limping in. Dred had been severely bitten in the shoulders and Rock in the head. Coaly was bloody about the mouth, where his first day's wound had reopened. Then came the four men, empty-handed, it seemed, until John slapped a bear's "melt" (spleen) upon the table. He limped from a bruised hip.

"That bear outsharped us and went around all o'you-uns. We follered him clar over to the Spencer Place, and then he doubled and come back on the fur side o' the ridge. He crossed through the laurel on the Devil's Court House and tuk down an almighty steep place. It was plumb night by that time. I fell over a rock clift twenty feet down, and if 't hadn't been for the laurel I'd a-bruk some bones. I landed right in the middle of them, bear and dogs, fightin' like

gamecocks. The bear clim a tree. Bill sung out 'Is it fur down thar?' and I said 'Purty fur.' 'Waal, I'm a-comin',' says he; and with that he grabbed a laurel to swing hissself down by, but the stem bruk, and down he come suddent, to jine the music. Hit was so dark I couldn't see my gun barrel, and we wuz all tangled up in greenbriers as thick as ploughlines. I had to fire twiste afore he tumbled. Then Matt an' Granville come. The four of us tuk turn-about crawlin' up out o' thar with the bear on our back. Only one man could handle him at a time—and he'll go a good two hundred, that bear. We gutted him, and left him near the top, to fotch in the mornin'. Fellers, I'm bodaciously tired out. This is the time I'd give half what I'm worth for a gallon o' liquor—and I'd promise the rest!"

"You'd orter see what Coaly did to that varmint," said Bill. "He bit a hole under the fore leg, through hide and ha'r, clar into the holler, so t' you can stick your hand in and seize the bear's heart."

"John, what was that dream of yours?"

"I dremp I stole a feller's overcoat. Now d'ye see? That means a bear's hide."

Coaly, three days ago, had been an inconsequential pup; but now he looked up into my eyes with the calm dignity that no fool or braggart can assume. He had been knighted. As he licked his wounds he was proud of them. "Scars of battle, sir. You may have your swagger ribbons and prize collars in the New York dog show, but *this* for me!"

*from* Our Southern Highlands, *by Horace Kephart* (The MacMillan Company 1913).

## Jumping Ditches and Sabbath Fishing

At seven o'clock the next morning Arch, the champion fire-builder of the South, came into our room and started one of his masterpieces in the open fireplace. Arch's open fires in the morning—for it was frosty down there—would have made the trip worth while, even if we had not shot any quail.

After breakfast we all went outside and found the guides assembled in the pine grove which surrounded the house and bungalows. In a few minutes the hunters were starting out, some behind mules, the others behind—or rather in Fords. I am sorry to say we always went in a Ford.

That day we shot in a beautiful pine wood country. We jumped about 200 North Carolina ditches before night. Some days we jumped several thousand of them—at least I think it was several thousand. No matter where you are in that country, whether in cotton fields, pine woods, or dark swamps, you are never more than a hundred feet from a ditch. North Carolina went dry because of these ditches; it was found that as soon as a man got a few drinks in him he either fell into a ditch, or just gave up and spent the night among them for fear he would fall in. The country being as flat as a pancake, it is necessary to drain it with these ditches, which are from two to ten feet deep and no one knows how long. You will be walking through an impenetrable swamp where you are sure that the foot of man has never trod before, and suddenly find yourself on the brink—if not on the bottom—of a beautifully dug ditch. And the swamps are almost as prevalent as the ditches. Wherever there is a slight depression in the landscape, there is a swamp, or "bay." Sometimes they are wet, sometimes not, but they are always wild, thick, briery places, full of down-trees and stumps—regular jungles. The birds always fly for the nearest swamp when flushed, so that almost all the "single" shooting is in the thickest kind of cover. . .

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The stories of the spendid fishing to be had in the mill-pond for "jack" and "trout"—which, being interpreted, means pike and large-mouth bass—so inflamed our minds that we decided to have a try at them on Sunday. Now, that doesn't sound like anything very terrible, does it? Well, it proved to be terrible enough before we got through. I would rather take a chance with the inhabitants of that part of the country as far as my moral reputation is concerned, by murdering a few women and children than by being seen fishing on Sunday. We were told that it was not considered exactly righteous to fish on the Sabbath, so we made our preparations more or less under cover. Arch, whose religious feelings seemed to be a trifle less sensitive than the rest of the retainers on the place, was approached on the subject of fishhooks. He said he would see what he could do, and disappeared into his log-cabin. In a few minutes he returned empty-handed, but solemnly told us, in a whisper, that one Aleck Prevatt, who lived

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some two miles north of the General's, would probably lend us some "tackles." Aleck, it seemed, did not entertain the same horror of Sabbatical angling as his neighbors, so we started off through the woods for his place. In his absence his son fitted us out with a "brim tackle" and two "jack tackles"; this outfit was a small bamboo pole with six feet of light line and a small rusty hook for catching bream for bait, and two large bamboo poles with twelve feet of heavy cord and a large rusty hook for bass and pike. I have called "jack" pike several times, but I really think they are pickerel, although I did not have a chance to see one.

Well, the mill-pond was pointed out to us, and we started off on one of the most peculiar trips I ever took. In a few minutes we met several children; they fairly shrank off the road to let us pass. A dog, when he saw our nefarious "tackles," put his tail between his legs and flew away from our contaminating presence. Two people in a buggy looked at us as though our arms had been steeped in innocent blood to the elbows, while their mule shied away from us in holy horror. . .

We finally reached the mill-pond and proceeded to search for "brim" bait, in the form of grubs and beetles. Having secured a number of these, we fished for bream. Being Sunday, they refused to bite. After exhausting all our angling wiles on bream, we baited up with a piece of pork rind with which Arch had thoughtfully provided us. We still-fished, skittered, and did other miscellaneous kinds of fishing which are only possible with a Southern jack tackle. Being Sunday, of course the fish would not bite; so we hid the implements of sin and enjoyed ourselves exploring the upper reaches of the mill-pond. . .

I must tell you of our last covey. . . After lunch we went to a very special place which we had saved for the last day. Shortly after leaving the car, both dogs—Major and Colonel—made game. We followed them, step by step, out of the woods to a broom-straw patch; across this (and two or three ditches) to a cotton field. Major stood at a point about five times while Colonel circled, only to find that the birds were farther on. Out into the cotton field we went, and back through another patch of grass into the woods. Every second we expected to find the birds; the dogs were on a very hot trail. On the brink of a ditch both dogs froze on a point. We advanced a few steps, and watched the dogs' heads slowly swing from right to left. They seemed to be watching the birds as they ran. In a minute Colonel began to creep forward toward a patch of cat-briers. Major followed cautiously; finally on the edge of the brier patch Major stood fast, and Colonel circled to the opposite side of the briers, where he, too, turned to marble. A perfect back-up.

"Ah see 'em!" whispered Steve.

"Where?" I breathed. My heart was pounding with excitement. Steve lightly pointed my gun, and told me to look down the barrel.

"Whir-r-r-r!" The air was suddenly full of quail. "*Bang! Bang!*" went our guns as we "shot into the brown." Three birds dropped and we all stood marking down the singles, most of which dropped into a swamp about 150 yards ahead. The dogs retrieved the dead and we congratulated ourselves. There were about 22 to 25 birds in the covey—the best one we had seen. We had followed the birds for over twenty minutes, expecting at every step to flush them, and we were almost nervous wrecks.

In a few minutes we reached the swamp, feeling that we could put our fingers on the spot where the singles were. We went into the briers and undergrowth with guns at ready; Major pointed (a habit of his) but no bird rose. We hunted up and down every foot of that cover. Neither dog ever made game. We hunted the open ground on all sides of the cover; we hunted all the cover surrounding the open ground; we walked miles and jumped 873 ditches. We tore our clothes and we sweated. Finally we swore and jumped some more ditches. We took counsel together and then hunted in circles all that part of the country. We jumped every ditch in Robeson County before sundown, but we never saw the faintest sign of a single bird from that last covey.

*from "A Week in North Carolina," by Virginius* (Field and Stream, 1921).

## Currituck In The Battery Days

During my undergraduate days at Yale and again while doing graduate work at Harvard, I spent several Christmas vacations shooting at Currituck Sound, North Carolina. It was not only my notion of the best possible way to spend the holidays, but I derived a malicious pleasure out of returning to college weather-beaten and healthy, with a fine string of ducks and geese, to watch my classmates crawl in weary and haggard after two weeks of "heavy dates" and unholy hours.

Those were the days when a fellow could still shoot from a battery or sink box. From a conservation angle it is well that this type of shooting has been abolished, but with its passing went a most thrilling form of duck hunting.

I used to go to a public shooting lodge near Poplar Branch. The house stood on a one-tree island in a cove that served as harbor for fishing craft and gunning rigs.

The law compelled the battery boats and goose rigs to stay off the open water until sunrise, so at daybreak the craft lined up like crews at the starting line. Then as the rim of the sun appeared above the Kitty Hawk dunes, motors would cough, sputter, catch, and settle down to the work at hand. The

race for the favorite shoals was on.

Birds were by now moving up and down the sound, traveling, according to the weather, in high, well-formed V's or in low, ragged flocks. Here and there rafts of canvas, redheads, or bluebills formed black patches on the water.

When we had run for perhaps half an hour, Lem Saunders started taking soundings with a long pole. We were approaching a shoal and groping for a location.

Finally Lem held up the pole, one hand clasped at the watermark and Skipper Sawyer—Grover Cleveland Sawyer, a jovial three-hundred-pounder—shut off the engine, while Lem flung out the mud hook.

Then with block and tackle we hoisted up the battery and swung it overside. Lem scrambled into the box, unfolded the wings, and we started passing him the square blocks of iron that he placed in compartments alongside the box to make the outfit lie as low in the water as possible. The irons weighed forty pounds apiece, and there were a lot of them, but after the cold ride the exercise of passing them was most welcome.

Finally, when the battery was all rigged, I handed Lem my gun and a hundred shells. Then he and I changed places, and I set about getting myself squared away in the battery, shell bag hanging on a nail in front of me, pit sponged of the last drop of water, seat wiped dry, and the iron ducks that were sitting on the deck arranged so as to balance the box just right.

By now the men were well along with the setting of the decoys. Around me they poled in a high-sided skiff, tossing out the stand of a hundred and fifty or more big, battered canvasback decoys. They put fewer blocks upwind than elsewhere, so when their work was finished I found myself just inside the windward edge of a great circle of bobbing steel.

I stood up, smoking my pipe and batting my arms against my shoulders, as they poled for the battery boat.

"If she starts taking water, toss over the irons that have strings tied to them," Grover bellowed at me. "If you want anything, stand up on the deck and wave your arms."

Then he leaned over his motor. It gave a couple of promising coughs, then started, and the boat chugged off down the wind.

A mile to the east of me the low sand dunes that keep out the salt water of the Atlantic formed an irregular, light yellow line against the morning sky. Two miles west I saw the dark bulk of pine-covered mainland. North and south the water stretched away to meet a bright blue sky daubed with white clouds.

I wondered if the skipper of a battery boat ever forgot to come back for his gunner.

Far to the south birds were on the wing as I plugged shells into my 12-gauge Winchester pump, relit my pipe, and settled down. I sat on my spine, knees pushing hard against the front of the box, and my oversized rubber boots resting on the floor of the pit.

My eyes were just above the rim of the box and the surface of the water. The waves ran by, keeping the decoys dancing. They flowed down over the long windward flap, and sometimes water slid along the deck. The box rocked with a comfortable, sleepy motion.

A little bunch of ruddy ducks—"boobies," the men always called them—raced by, five feet over the leeward edge of the stool, and were gone before I could do anything to stop them. Off to the right a dozen big birds were coming my way across the wind. I slid still lower in the box, nose against the side, eyes just at the rim. They kept coming. "Cans" without a doubt. But they were sliding off with the wind, were going to pass me to leeward. Then they swung around, deliberately, on set wings. I slipped off my right glove, then my left. Their wings were at work again, driving them forward, straight toward me. Majestically they sailed for the lower edge of the decoys. I had buck fever on the first shot, but crumpled one with the second, got another with the third. The first fellow was right side up, his head out of water. I stood up and finished him off; then watched them drift away toward the battery boat anchored half a mile below.

Out of the corner of my eye I caught the flash of wings. I sank into the box as five bluebills passed wide over the head of the stand and hurried on to the south.

Canvasbacks and redheads kept coming with fair regularity as the morning wore on. Now and then a bunch of boobies appeared out of nowhere, hurtled past just over the

N.C. WILDLIFE RESOURCES COMMISSION

fringe of the decoys. Sometimes I saw them in time to fling shot at them. They flew in such tight flocks that once I got four with one shot.

A bunch of bluebills came in with the utter lack of caution that they sometimes display. I knocked three out of that flock just before Sawyer and Lem came chugging up to take me aboard for lunch.

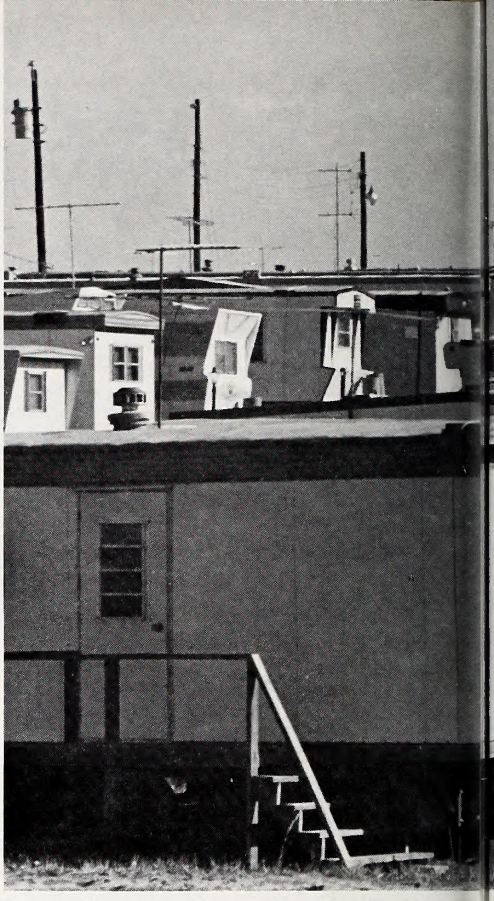
We anchored and, squatting in the lee of the cabin, munched our thick sandwiches. "Fourteen this morning," Grover said. "That's not bad."

About midafternoon the wind shifted, and it began to blow. Water rolled in over the coaming around the box and kept me busy with the bailing can. The ducks began moving from the middle of the sound toward the lee shore, and many of the flocks took a good look at my decoys. Some of them did more than look and gave me nice shooting. Then the water started coming in faster than I could bail it out, and I signaled Grover and Lem to pick me up. But not before I had killed my limit, which was twenty-five birds.

That day was typical of the fine battery shooting that one had with reasonable frequency on Currituck in the early twenties.

*from* Whistling Wings, *by Martin Bovey* (Doubleday and Company, Inc., 1947). ⊠

# Looking at The Next 50 Years



## What's in store for North Carolina's wildlife during the next five decades? Some of the state's environmentalists and sportsmen share their predictions.

*During the next 50 years, what will be the chief problem confronting North Carolina's wildlife and other natural resources?" That was one of the questions we asked 15 North Carolinians across the state as we put together this issue. The other was, "What solution(s) to this problem would you like to see?"*

*These are pertinent questions. During the last 50 years, North Carolina has changed from a heavily rural state of 3½ million citizens to a developing and urbanized state of 6 million. While this development has benefitted many communities, it has affected wildlife in largely negative ways, destroying habitat in some cases and polluting it in others.*

*During the same 50 years, of course, some wildlife populations have actually expanded, notably the white-tailed deer and the wood duck, and the public has increasingly supported efforts to protect the environment.*

*Our writers are representatives from sportsmen's groups, universities, government and industry who looked into their crystal balls for us, and reported what they saw ahead. We hope you'll find their comments informative and helpful.*

**Representative Anne C. Barnes**
**Chapel Hill**

Poor growth management will be a major problem. Government at all levels needs sounder growth policies with clearer priorities. It's a tedious, but not impossible balancing act to provide for economic growth and all it entails (industry, jobs, roads, landfills, reservoirs, housing, services), while protecting our natural resources. The environment has been getting the short end of the stick. Government should get serious about water and air pollution, soil erosion, hazardous waste, prime farmland, acquisition or stricter controls of environmentally sensitive areas. I agree that the public is supportive—it is the public officials who are lagging behind.

**Bob Brown**
**Biologist, Wildlife Commission**
**Morganton**

In the mountains the biggest problem I see in the next 50 years is the ever-increasing encroachment of man on streams and the riparian zone—the area close to the stream and the stream bank. In the mountains we crowd it with agricultural use and road construction, with housing and trailers. The problem is perhaps more critical in the mountains because we have less flat land there.

For things to change I see the need for regulation of man's activity. To see any changes occurring to this ever-changing problem, we're going to need some sort of regulation to minimize man's impact along these areas. We need to make people use best-management practices.

**Derb Carter**
**Attorney**
**Raleigh**

The chief problem confronting North Carolina's wildlife resources during the next 50 years will continue to be the loss of habitat. Hatitat destruction can result from a range of activities and includes contamination of rivers and streams and conversion of wetlands, farms and forests to intensive land uses.

It is critical that the state take several measures to protect wildlife habitat and insure that North Carolina's natural heritage is maintained for future generations. Statewide comprehensive planning should be initiated which includes as an element the protection and management of key wildlife habitat areas. Adequate funding for the identification and acquisition of important natural areas and habitat threatened with development must be insured. Economic incentives to encourage private property owners to protect wildlife habitat should be expanded.

**Michael Corcoran**
**Executive Vice President**
**N. C. Wildlife Federation**

The continuing urbanization of North Carolina will be a major problem for our state's wildlife over the next 50 years. In addition to destroying habitat, the growth of cities and towns, along with the establishment of new industries, can cause major problems with the quality of our waters and purity of our air.

The solution lies in increasing the awareness in all citizens of North Carolina of just how precious our wildlife and natural resources are.

JIM DEAN

***Coastal development*** *worries many who look into North Carolina's future. Where extensive maritime forests once grew, trailer courts and condominiums have sprung up. Conservationists continue to work for the management of coastal development.*

**William deBuys**
**Former Executive Director**
**N. C. Nature Conservancy**

Habitat protection is the key to maintaining our wildlife resources. In the past the state has done a generally fair job of protecting critical terrestrial habitats, usually through acquisition, and The Nature Conservancy is proud to have taken part in many important projects. All our past successes, however, have been on a project-by-project, *ad hoc* basis. If we are to do an adequate job of habitat protection in the next 50 years, our efforts must become more thorough and systematic. This can only occur if the state, through the General Assembly, makes a strong and well-funded commitment to the protection of North Carolina's natural lands.

**Jay Hair**
**Executive Director**
**National Wildlife Federation**

The problems confronting wildlife during the next 50 years are the same ones confronting them now. The biggest problem is habitat loss, and in a state like North Carolina that is particularly acute in the Piedmont and Coastal Plain.

In a broader context, the most important environmental issue on our nation's agenda has to be the proper role of toxic substances in our society. Another issue is water, both quality and quantity. Water is probably going to be the most controversial natural resource issue in the next decade.

More laws and regulations are not the entire solution. I think we need to look at what laws the state does not have now—groundwater protection, for example—and develop those, but these problems are only going to be resolved through an enlightened and concerned citizenry. We should take a strong leadership role in the area of education and make sure that environmental education is integrated in the other educational needs of young people in North Carolina.

**Glenn C. Harrelson**
**N. C. Ducks Unlimited**

The main problem for wildlife for the next 50 years will be habitat. As we increase our population we are using more land, clearing more woods, filling in more marshlands and reducing the natural habitat for wildlife. In the beginning of our country we had 215,000,000 acres of wetland and now we have 95,000,000 acres left. That is a 54 percent decrease. At that rate, we lose 450,000 acres of wetland a year. If we keep losing at this rate there will be none left.

We need to save and protect as much wetland as possible and these are two of the main goals of Ducks Unlimited. We're doing this now in the United States, Canada and Mexico. We began this endeavor in Canada but more and more of our monies are being spent in the United States now.

We have a project now in North Carolina to save Conine Island. We need to look harder at projects like that and really try to maintain our coastal areas before it is too late.

***The pace of development*** *throughout the state threatens the habitat of many wildlife species. Marsh development removes feeding grounds for creatures like the egret, and also undermines the entire food chain in which fin fish and shellfish exist.*

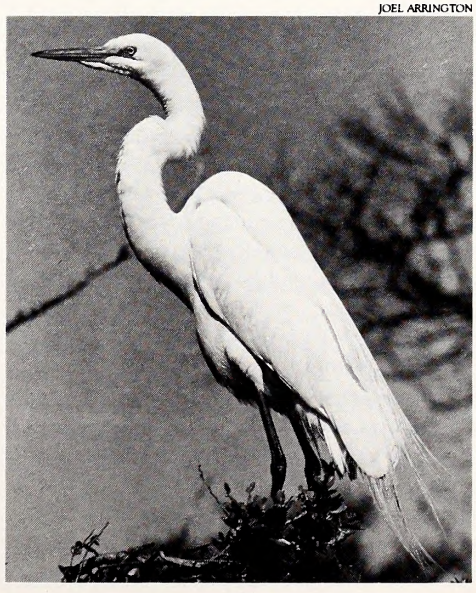
**Wayne Heffinger**
**Catawba County Wildlife Club**

The chief problem confronting North Carolina's hunters, especially in Catawba County, is securing enough public land for hunting.

There are a lot of large tracts of private lands to hunt, if you know the right landowners and get there first. But that doesn't help everyone.

In the next 50 years, I believe the deer

JOEL ARRINGTON



N.C. WILDLIFE RESOURCES COMMISSION

***Nearly 2½ million acres** of pocosins grew in the Coastal Plain in 1962, but in 1979 only about 700,000 acres still remained. The clearing and draining of pocosins has threatened the black bear, a species that depends on them for food and shelter.*

populations could outgrow the privileged hunter, causing a lot of damage to farm crops. This may create poaching and illegal kills.

The possible solution to this problem is to continue with our controlled hunting seasons and try to establish some game lands in our area, before our cities expand any more.

**F. Eugene Hester**
**Assistant Deputy**
**U. S. Fish and Wildlife Service**

The chief problem will be loss of habitat. A fundamental aspect of the problem is that while wild animals belong to all of us, the land on which they live is typically privately owned. As our human population increases, more land will be converted to alternate uses which are more financially rewarding (housing developments, shopping centers, etc.), resulting in less habitat for wildlife.

Solutions could include providing incentives (tax relief, financial incentives, etc.) for landowners to retain high-quality habitat; greater restrictions on wetland destruction; and requiring adequate mitigation for habitat lost through development by public agencies.

**Senator Charles W. Hipps**
**Waynesville**

The chief problem will be the increased population of the state causing available lands for outdoor recreation to shrink and creating more pollution, erosion, sedimentation, ground water contamination.

The solutions: (1) enhance and protect existing available lands; (2) develop close working relationships and incentive programs with private land owners; (3) educate the public to respect property and have concern for wildlife management; (4) control construction practices to protect water sources; (5) strengthen law enforcement through additional outlays for personnel, training, and equipment.

Conservation, education, public support, proper legislation, funding and a strong enforcement effort will have a positive influence on the future of wildlife in North Carolina.

**Bill Holman**
**Lobbyist**

Today North Carolinians are benefitting from decisions made 50 years ago such as the establishment of the Great Smoky Mountains National Park and the creation of the Soil Conservation Service. The fate of North Carolina's environment 50 years from now depends on decisions made by our political leaders today.

I predict that in the next 50 years industries will reduce hazardous waste and prevent water and air pollution by becoming more efficient, by redesigning their processes and by recycling. I also predict that technology to clean up leaking underground gasoline storage tanks and hazardous waste dumps will improve.

I predict that we'll still be arguing and wondering how and where to store radioactive wastes 50 years from now.

I predict that in the next 50 years North Carolina's natural heritage will either be bulldozed and planted in condos or soybeans or acquired by public and private efforts.

I believe that North Carolina's greatest challenge in the next 50 years is to develop an environmental ethic that recognizes and appreciates the value of North Carolina's quality of life and that does not tolerate its destruction.

**Todd Miller**
**Executive Director**
**N. C. Coastal Federation**

Water quality is our best barometer by which to gauge the success of efforts to protect the natural resources of our coastal region. All indications are that water quality is deteriorating along our coast as natural habitats are altered for urban, agricultural and forestry development. The chief problem is the absence of strong regulatory programs to protect water quality and guide land use. Most local governments do not see it as their responsibility to devise growth management programs that will protect water quality. This is because state and federal regulatory agencies have not enforced existing water quality laws that could prevent land uses that degrade the environment. When state and federal water-quality agencies stop condoning polluting land uses, local governments will be encouraged to devise growth-management programs that will protect the coastal environment.

***Education will be the key** to future resource protection as a growing state puts more and more pressure on wildlife habitat. As children learn about wildlife and ecological principles, they will more likely make informed decisions as adults about the wise use and care of our natural resources.*

**James E Parnell**
**Ornithologist**
**UNC at Wilmington**

The primary problems facing wildlife in North Carolina over the next 50 years will, I think, continue to be pollution and loss of natural habitats and the pressure of more people sharing limited resources. Environmental education provides the beginning of the solution. We must all accept responsibility for maintaining a clean, healthy, diverse environment for wildlife and for us. We must become as concerned about the health of our shared environment as we are our personal health. Within the framework of a healthy environment, we can begin to deal with other more specific wildlife problems with expectations of finding long-term solutions.

TOM JACKSON

**Robert E. Shepherd**
**Executive Director**
**Land of Sky Regional Council**

North Carolina will be one of the fastest growing states—a cause for wildlife and natural-resource concern. Rapid development will adversely affect groundwater and wetlands. Wildlife and fish habitat will yield to buildings, impervious surfaces, and hydrologic changes. Man's polluting actions will further reduce mountain trout waters and fish and shellfish habitat on the coast. Public handling of acid rain and solid and hazardous waste issues will be critical.

***Concerned environmentalists*** *target water as one of the important natural resource issues of the future. Will our current laws protect the quality of our water, and will we have enough water to go around?*

Logic requires greater long-range environmental education efforts in public schools. Local citizen groups such as the French Broad River Foundation—a clearinghouse for water and other natural resource issues in our region—need to be formed.

DEBBIE CONGER

**J. H. Stutts**
**Union Camp Corporation**
**Franklin, Virginia**

The problem is that growing human populations and their demands for recreation, living room, and forest products will have a big impact on wildlife in the coming half century.

The solutions are three: 1. We must have required wildlife and environmental education courses—including the ethics of coexistence. The public must be taught that business, government, and individuals share the responsibility, and decision makers must have a built-in sensitivity to conservation. 2. We must use wildlife expertise in planning. Clear cutting can be beneficial—areas can be left unharvested—if proper planning is used. 3. Best management practices (BMP's) must be emphasized. ⊠

# Celebration Of Wilderness

## Joyce Kilmer Memorial Forest is also celebrating a golden anniversary as the largest virgin wilderness in the eastern United States.

by Lawrence S. Earley

photographed by Rick Ardolino

It was raining on that July 30th in 1936. The winding, newly built dirt road grew slick and several of the important guests didn't make it to the ceremonies. They were mired in mud somewhere along the 14-mile stretch between Robbinsville and the mountain glade where the road ended, a few miles short of the spot where the speeches would be given. Even when the skies cleared late that morning, there was nothing they could do.

In the forest ahead, 50 guests had arrived without incident and together with scores of U. S. Forest Service personnel they listened to a message from President Franklin D. Roosevelt saluting a former journalist, poet and soldier who had died 18 years before on a field in France. "It is particularly fitting," the president wrote, "that a poet who will always be remembered for the tribute he embodied in 'Trees' should find this living monument. Thus his beloved memory is forever honored and one of nature's masterpieces is set aside to be preserved for the enjoyment of generations yet unborn."

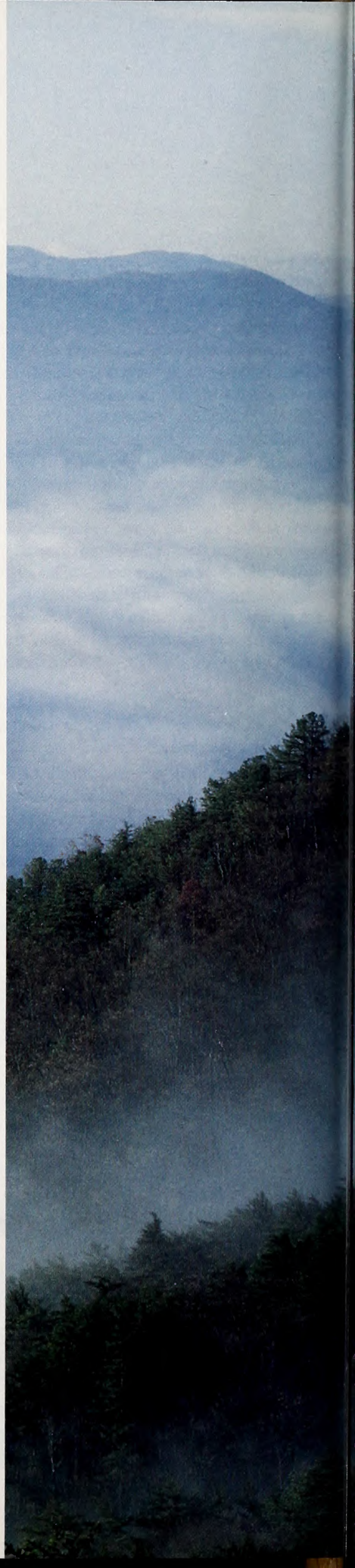
The poet, of course, was Joyce Kilmer, and the "masterpiece" the president referred to was the Joyce Kilmer Memorial Forest, probably the last extensive tract of virgin forest on the East Coast, which was being dedicated that July morning. Part of the Nantahala National Forest, the 3,840-acre tract had been selected to honor a man who had won a certain fame early in life and perhaps immortality with his death on a World War I battlefield. Although he wrote other verse, Joyce Kilmer was best known as the author of "Trees," a poem that has been recited for decades by children at Arbor Day exercises, and whose first stanza is arguably the most familiar of any poem by an American:

> "I think that I shall never see
> A poem lovely as a tree."

The man whose name the Forest carries had no connection to Graham County and most likely never visited North Carolina. Joyce Kilmer was one of those men who possibly achieved more fame by dying young than he ever might have won had he lived longer. He grew up in New Brunswick, New Jersey, and taught school for awhile before tiring of that and seeking employment in New York City. He worked at several jobs before finding a niche at *The New York Times*. There he wrote articles and poems, publishing several volumes of verse by 1917, the year the United States entered the European war. Kilmer joined the U. S. Army almost immediately, and was eventually shipped overseas as an infantryman with the 165th Infantry, then part of the legendary "Fightin' 69th," now known as the Rainbow Division. He was killed by a sniper's bullet on July 30, 1918. He was 31 years old.

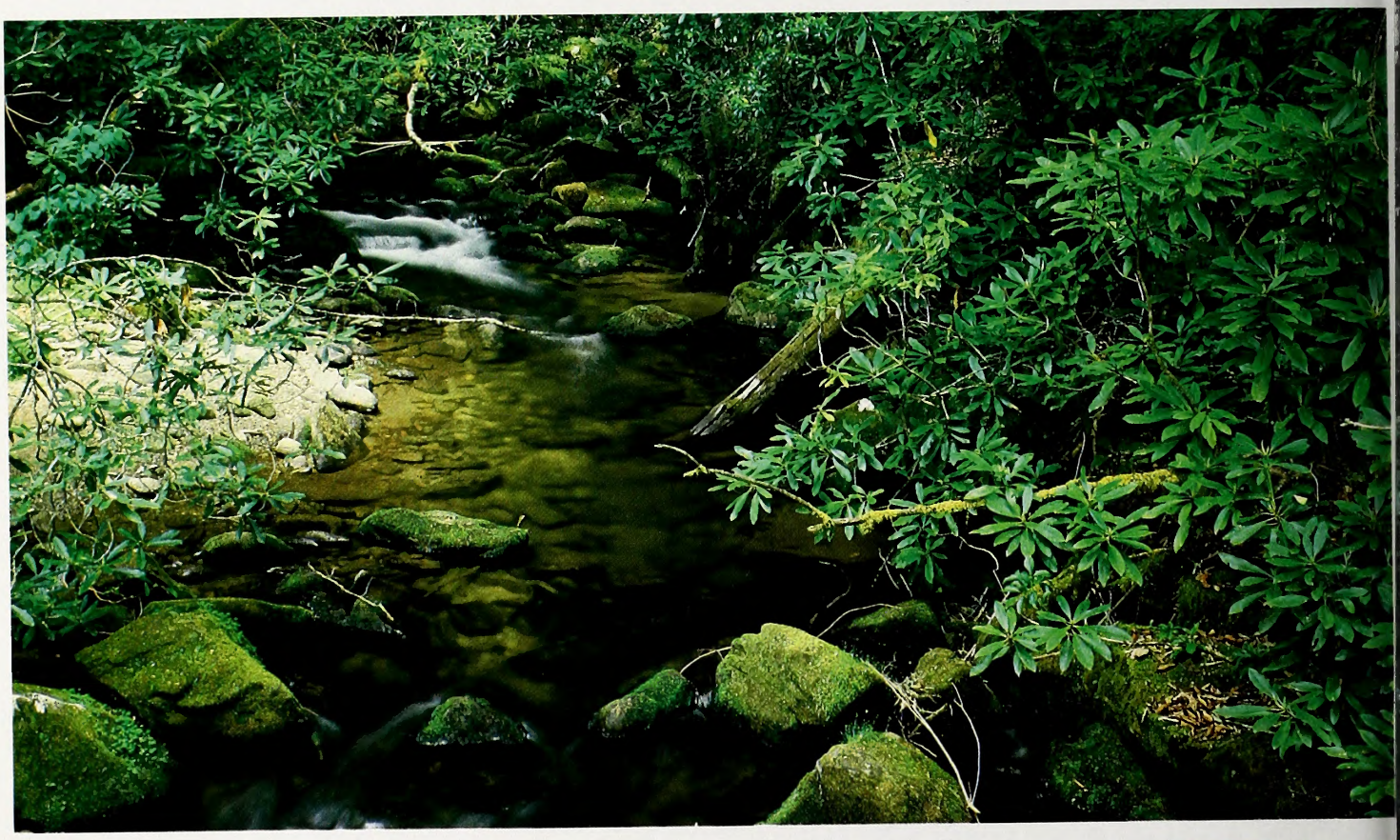
The movement to name a forest after him began in 1934 when a New York chapter of The Veterans of Foreign Wars petitioned the government to find a suitable memorial for the poet. The U. S. Forest Service joined in the search for a tract of virgin timber and eventually identified the area drained by Little Santeelah Creek as probably the last truly virgin wilderness left on the East Coast. Two years later, the Forest was officially "set apart and reserved for public recreation and closed to all other occupancy and use." The name Joyce Kilmer had become synonymous not only with trees, but with wilderness.

The Forest itself is magnificient, one of the few remnants of the original Southern Appalachian hardwood forests that fell to



***Autumn scene** shows a swath of Joyce Kilmer Memorial Forest. This 3,840-acre virgin forest constitutes one of the remnants of the original forest that covered the slopes of the Southern Appalachians.*

This is no third-growth Piedmont forest, with a scraggly undergrowth of thin saplings. The trees are huge and in summer plunge the ground below into deep shade.



the loggers' axes in the 19th and 20th centuries. Visitors can take their measure of the Forest by several trails totalling 60 miles. A 2½ mile trail, the Joyce Kilmer Memorial Trail, takes the morning walker to the bronze plaque that was unveiled 50 years ago at the dedicatory ceremonies. In Poplar Cove, hikers will pass giant yellow poplars, some of them 20 feet at the base and towering 100 feet into the air. Jenkins Meadow Trail takes the visitor 10 miles to Hayoe Overlook, 5,249 feet high, and nearby Naked Ground Trail takes you back to the parking lot along the creek.

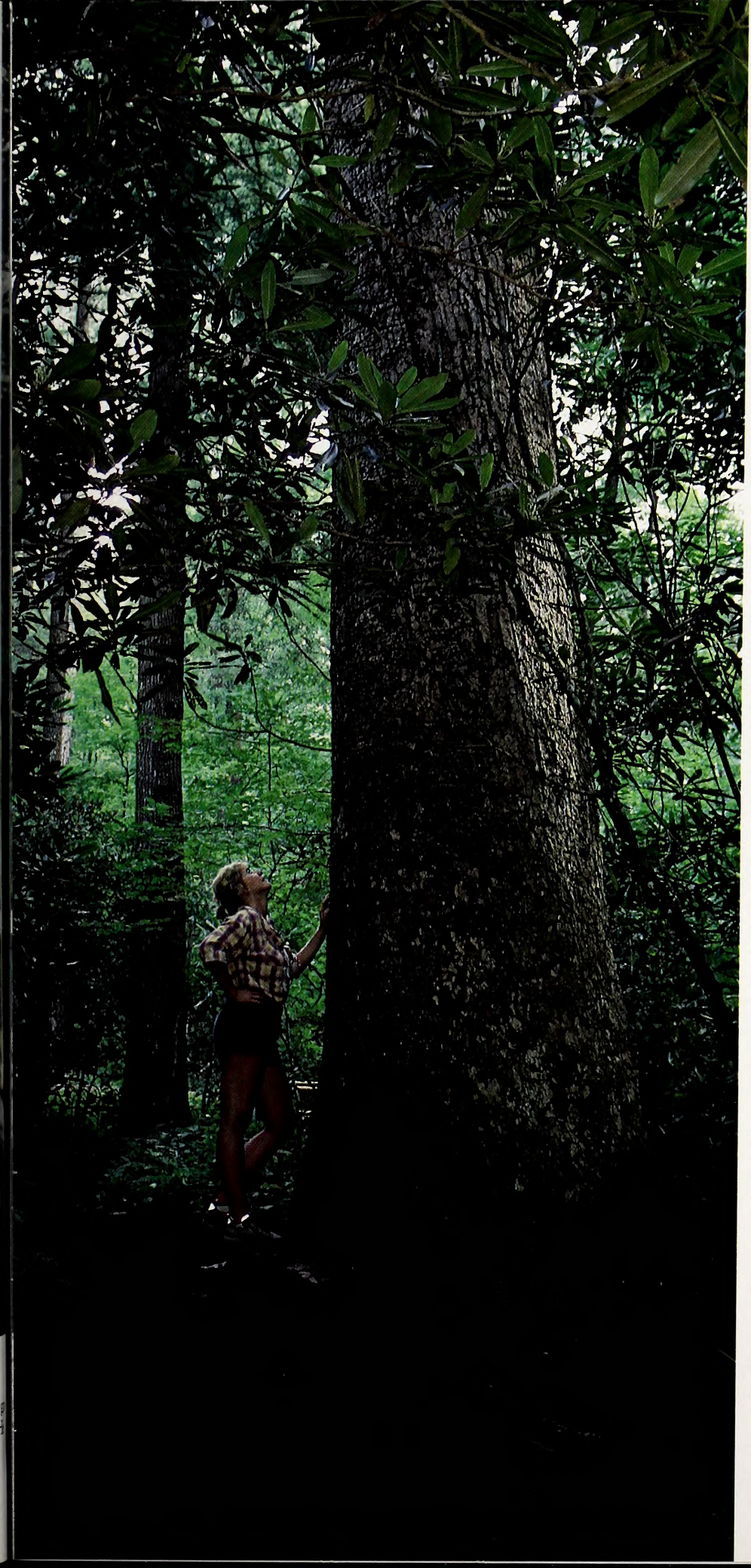
On the way, entertain yourself by trying to identify as many of the Forest's 100 tree species as you can. Besides yellow poplar, these include hemlock, sycamore, basswood, dogwood, beech, maple, white pine, several species of oak and many more. This is no third-growth Piedmont forest, with pines and a scraggly undergrowth of thin saplings. The trees are uniformly huge and in summer plunge the ground below into deep shade. The ground is covered with ferns, mosses and other plants that can grow in the shaded conditions.

***Sixty miles of trails*** *lead the visitor to Joyce Kilmer into primeval forest scenes, up ridges, past fallen chestnut tree giants, splashing waterfalls. Black bear, wild boar and whitetail deer are found here. Hunting and fishing are allowed in season.*

The sight of immense dead trees littering the forest floor may be surprising to visitors. Some are the ill-fated chestnut trees that died of a mysterious blight and fell with the rest of their kind. No logging is allowed in Joyce Kilmer. All trees that die lie where they fall, rotting and providing niches for creatures of the soil.

The state of the forest was the subject of a lively debate in *American Forest* magazine in 1972 and 1973. The debate was triggered by an article by Howard A. Miller who was appalled at the sheer numbers of over-mature trees that were dying unharvested

in the virgin forest. "Joyce Kilmer Forest shows beyond any question the rapidity with which southern Appalachian forests go to pieces when left untended," he wrote. He called into question the set-aside policies that prohibited logging, suggesting that



***Over 100 species** of trees are found in Joyce Kilmer Memorial Forest, many of them impressive specimens like this hemlock. Forest patriarchs reach such sizes because logging is forbidden in the virgin wilderness.*

without man's tending hand the entire forest would die within a generation.

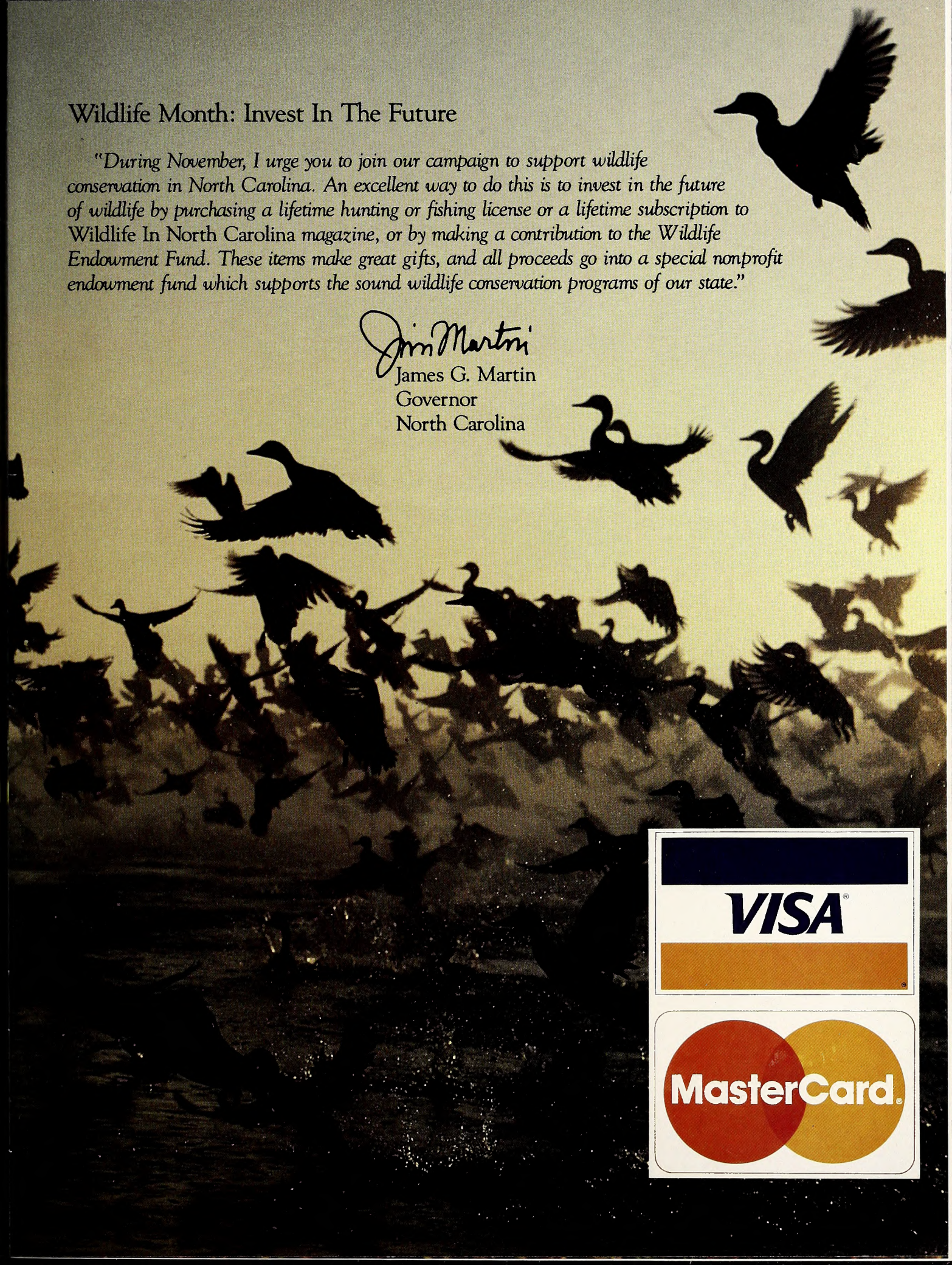
In subsequent articles over the next several months, several writers defended Kilmer's hands-off policies. If forests "go to pieces" without man's hand, Chapel Hill's Wallace Kaufman wondered, how had the forests survived before European settlement? He defended Joyce Kilmer by reminding Carter that compared to the 20 million acres of commercial forests in North Carolina, Joyce Kilmer's 3,840 acres were "insignificant." Other writers drew attention to the natural life cycle of forests as demonstrated by Kilmer. The death of old-growth trees opened spaces in the understory to light and encouraged new growth. The rotting bodies were essential sources of nutrients for other growing plants. ". . . death is truly a necessary part of life," wrote two researchers from the Oak Ridge National Laboratory in Oak Ridge, Tennessee. Rather than a decadent forest, Joyce Kilmer was an example of a forest that had naturally replaced itself for thousands of years before man had ever set foot in it, a living lesson from nature.

Joyce Kilmer has been celebrating its anniversary during the year with a trio of celebrations in May, July and October. U. S. Forest Service officials were glad to welcome both of Kilmer's surviving children to the festivities. Kenton Kilmer, Joyce Kilmer's son, spoke at the May 31 proceedings, saying that the forest was "a most fitting memorial for his love of God, his love of man and his love of the countryside, and particularly his love of trees as God's creation."

Nestled in a corner of Nantahala National Forest, Joyce Kilmer Memorial Forest is part of one of the most extensive national recreation areas in the nation. Nearby are Pisgah, Cherokee, Cattahoochee, and Sumter national forests, and the Great Smoky Mountain National Park (celebrating its own 50th anniversary soon). In 1975, nearly 14,000 acres of the Nantahala, including almost all of Joyce Kilmer, were included in the Joyce Kilmer-Slickrock Wilderness.

Together, these lands offer North Carolinians a priceless heritage of physical beauty and splendor. Happy birthday Joyce Kilmer! ⊠

# A TIME FOR GIVING...



## Wildlife Month: Invest In The Future

*"During November, I urge you to join our campaign to support wildlife conservation in North Carolina. An excellent way to do this is to invest in the future of wildlife by purchasing a lifetime hunting or fishing license or a lifetime subscription to* Wildlife In North Carolina *magazine, or by making a contribution to the Wildlife Endowment Fund. These items make great gifts, and all proceeds go into a special nonprofit endowment fund which supports the sound wildlife conservation programs of our state."*

Jim Martin

James G. Martin
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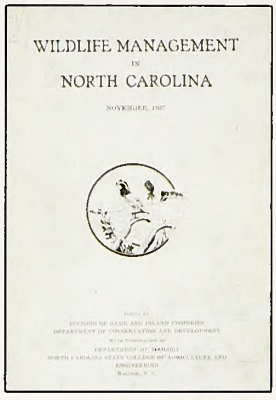


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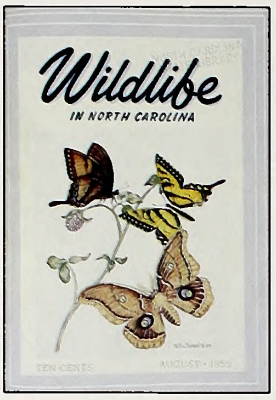


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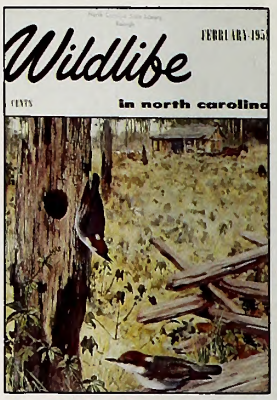


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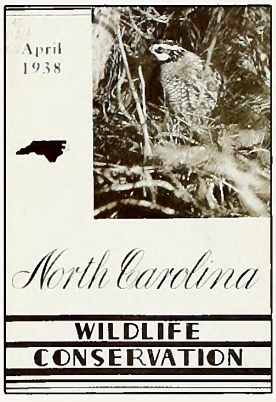


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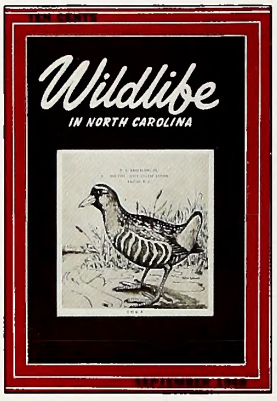


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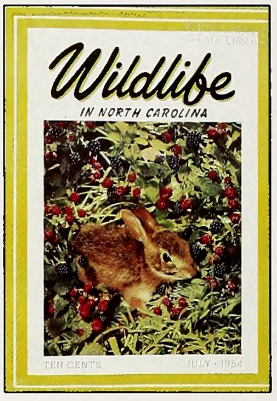


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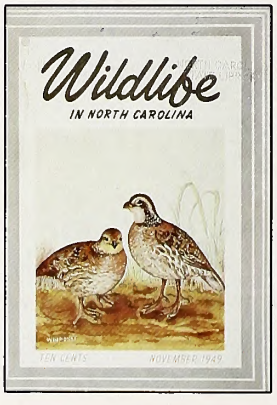


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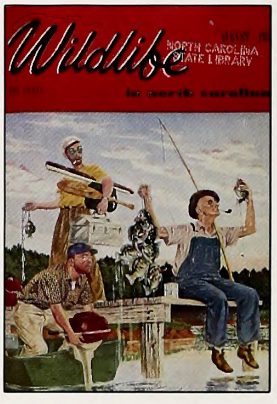


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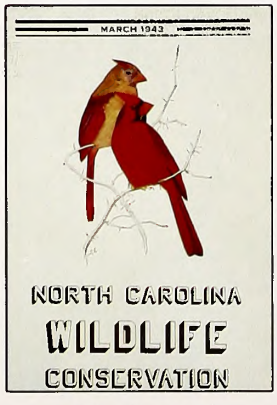


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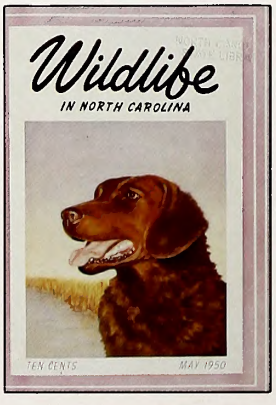


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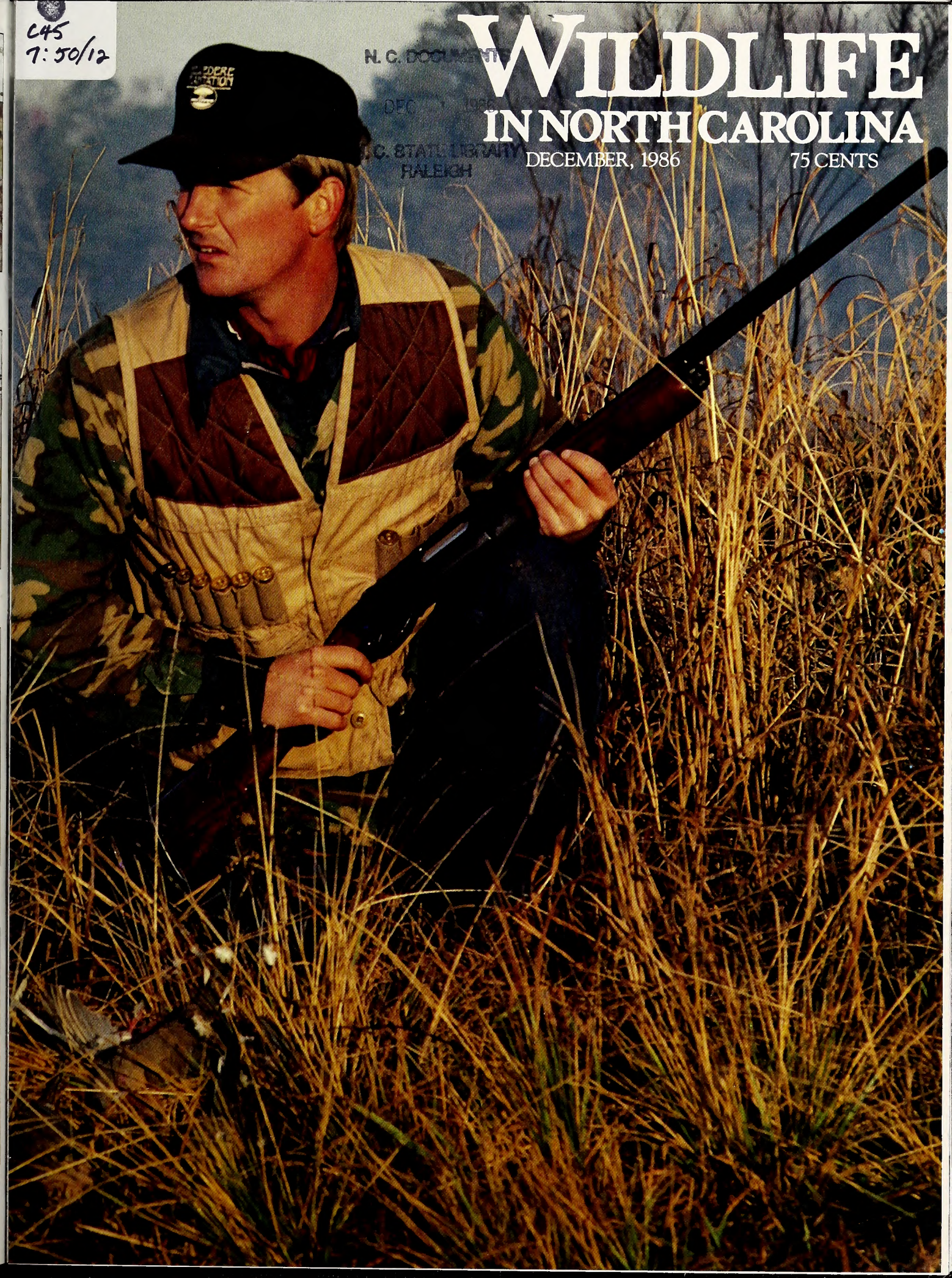
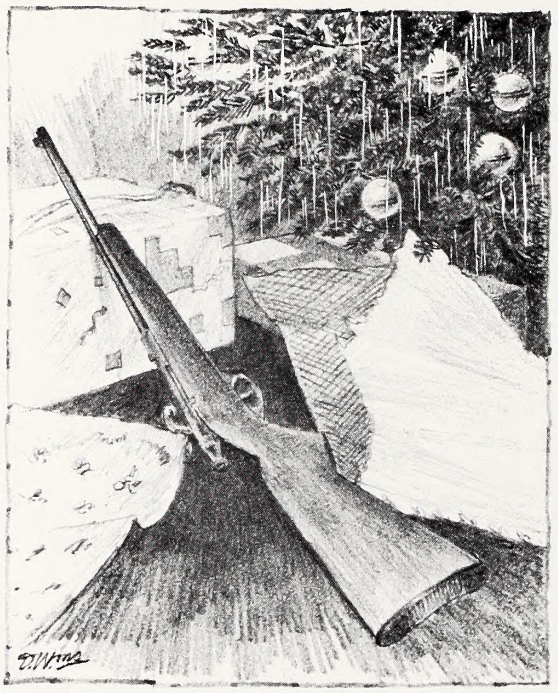


# Santa Packed A Shootin' Iron

*by Jim Dean*

There was a time in North Carolina when a gun was a fairly common gift at Christmas. Kids who played cowboys virtually every day of the year were often overjoyed to find a real gun—an air rifle—under the tree when they were eight or nine years old. A few years later, a .22 rifle or a single-shot 20-gauge shotgun might follow. Boys were the most frequent recipients, of course, but girls also often put a gun on Santa's list, and got it.



As for me, nothing I ever got for Christmas—except possibly a bicycle—ever meant as much as the .22 Winchester bolt-action rifle I got when I was 12, or the 16-gauge Sterlingworth Fox that followed some years later. I can still recall the dark, oily gleam of blued steel in the red, blue and green lights of the tree.

Today, I suspect fewer families give guns, although they were once as traditional as a bike, doll or Teddy bear. For many youngsters, a gun for Christmas was a rite of passage, a ticket to adulthood that implied paternal confidence in growing maturity. It was a challenge most kids accepted eagerly, and nobody thought of Santa as a red-suited Pancho Villa sporting bandoliers full of cartridges and carrying enough weaponry to arm a third-world nation.

There are several possible reasons for the decline in guns as gifts, some more obvious than others. Fewer families live in the country today, and the loss of rural traditions has helped create a climate where guns are feared rather than respected. It is also likely that the growing incidence of one-parent families has created situations where no one is on hand to carry out the essential instruction that follows the unwrapping of the gift. Today, many people associate guns only with war, terrorism, crime and TV's distorted notion of high adventure. Fewer associate guns with the pleasures of target shooting or hunting, and even if they do, many are likely to consider anyone who indulges in such sports to be an insensitive throwback.

You could argue that I'm something of a throwback, myself, since I don't believe gun ownership is necessarily evil. It could also be argued, I suppose, that I had no business roaming the woods and fields alone at the age of eight with my Daisy Red Ryder carbine, but I spent many happy and harmless afternoons shooting at dirt clods, tin cans and bottle caps. By the time I was older and carrying a real rifle or shotgun, I was no more of a danger to myself or anyone else than if I had been toting a water pistol. Indeed, I did more damage with the bicycle when the chain came off one day on a long, downhill run and the only way I could stop was to run through a hedge.

A gun received at Christmas was—and still should be—only the first part of the gift. What followed was a long and enjoyable apprenticeship with a father or grandfather during which you learned proper safety and respect for a potentially deadly tool. That process usually began under the tree with a warning. "Treat every gun as though it were loaded, even if you're absolutely sure it's not," I recall my Dad telling me. "If I ever see it pointing at anyone even for a moment, I'll take it away."

The instruction continued as you got your first chance to load and shoot it at a target, and by the time you were allowed to hunt with it, you were thoroughly indoctrinated in the rules of safety and the laws and ethics that governed hunting. You could also look forward to years of shared pleasure afield with a role model who trusted you. It was a matter of honor, and you took pains to earn that trust.

It puzzles me to see gifts given to youngsters today that are at least as dangerous as a gun, yet seldom is any effort made to teach safety or instill respect. A family will give a kid a potentially dangerous three-wheeler or something equally threatening without the slightest instruction, and think nothing of it. Yet, they would grow pale and nauseous at the idea of giving that same kid a gun. Maybe I would too if I knew the kid, and worse, how little supervision he would get.

My purpose, however is not to recommend that you give your offspring a gun for Christmas this year. After all, you know your children—or should—and some kids are not ready for any gift that demands responsibility. Furthermore, you may not have the time, maturity or inclination to teach it, and if so, that's the sad part of it.

Santa apparently doesn't pack as much firepower as he once did (though he may need it in some of the places he visits). And one result is that fewer kids have the opportunity to receive a gift that has both the potential to teach responsibility, and also bring parents and progeny together through a sport that was once considered honorable and wholesome. For better or worse, we may be witnessing the end of that era.

*December, 1986*
*Volume 50, Number 12*

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# WILDLIFE IN NORTH CAROLINA

*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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**Back Of The Book** *by Mark Taylor*

**Cover** *When all of the major hunting seasons are open, many sportsmen tend to overlook the bird that ushered it all in way back in September. Yet, the second half of the mourning dove season can provide some spectacular sport, as Al Wooten discovered. Photographed by Curtis Wooten.*

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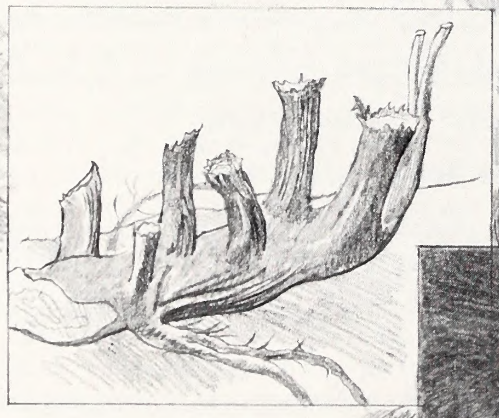
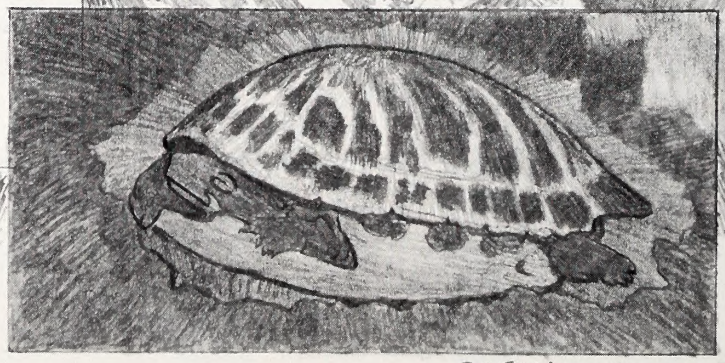
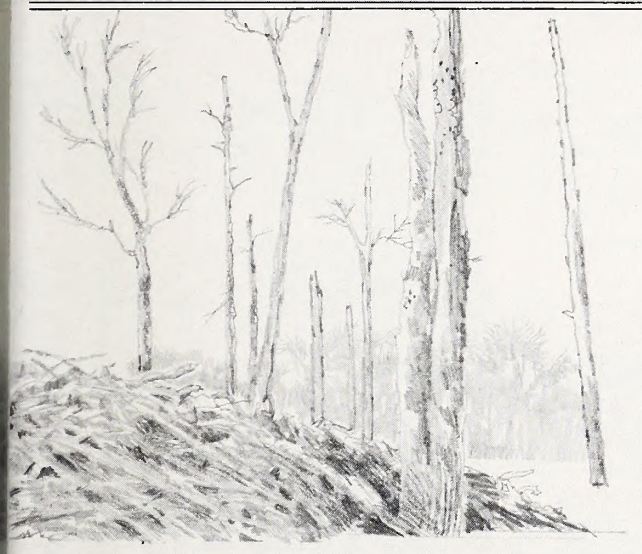
***Life in a pond*** *gradually slows down for most plant and animal species as winter approaches. Fish remain active in North Carolina ponds, but they will stay in deeper water, away from the colder shallows. Winter affects pond plants and animals in many different ways. Most shut down their operations until spring, while others are less active. Some few even increase their activities.*

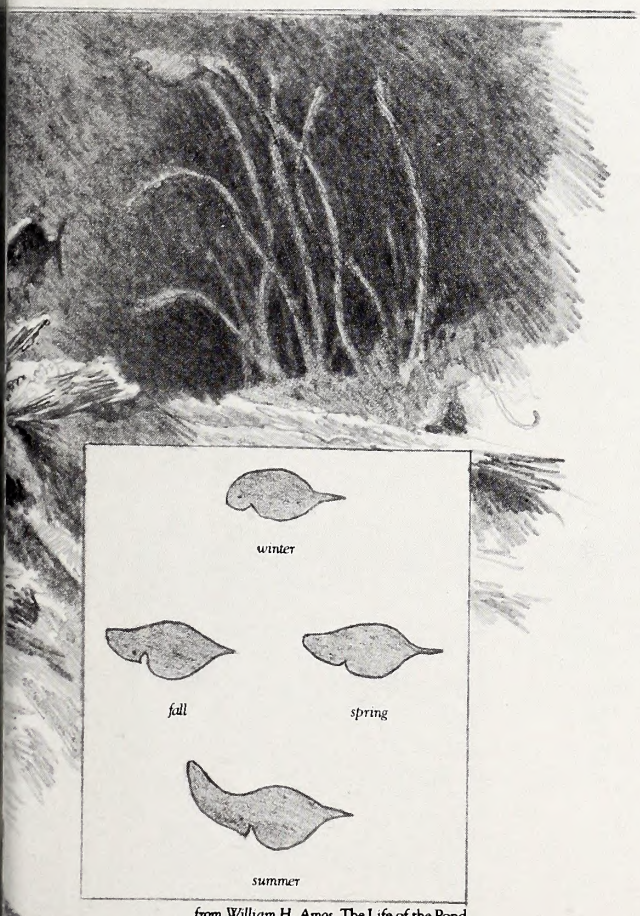
***The lily pads*** *of a perennial pond plant such as the water lily die back during the winter. Below the pond surface, however, the bud of next year's plant is protected in the rhizome, a food-storage organ buried in mud.*





***Turtles and frogs*** *bury themselves in the pond bottom during winter months. Their metabolism slows down, and they can exist for long periods without breathing, although they can take in oxygen by means of special body adaptations.*






from William H. Amos, The Life of the Pond

***Some zooplankton** species change their shape in response to winter. In summer, the heads of the water flea* Daphnia *are pointed. This increases its surface area and thus its ability to float in the less dense, warm water. But as winter approaches and the water cools, growing more dense, new hatches of* Daphnia *grow gradually rounder.*

# Life in the Winter Pond

*written by Lawrence S. Earley / illustrated by David Williams*

As winter steps on the heels of autumn, all nature is slowing down. A drab winter brown replaces the green coats of summer. Many plants are dormant now, protecting new life in bulbs or rhizomes below ground. In the cold, the metabolisms of many animals have also slowed , reducing their need for food and helping them survive in this season of scarcity.

The plants and animals of our ponds must also cope with the rigors of winter, and they do it in many ways. The broad green leaves of water lilies have disintegrated, yet below the surface their thick stems and roots protect the plant from the cold. Buried in the pond bottom are the rhizomes of other plants from which will spring new growth in March. The seeds of still others also insulate the life force.

For some plant species, winter is the time of their greatest growth. Algae and other microscopic plants grow best during this time. With little competition for sunlight from the the large-leaved emergent plants, different algae species bloom from week to week.

Our comparatively mild winters mean that ponds are rarely frozen for very long. Most ponds in North Carolina experience pulses of cold and then warmth, rarely icing over for very long. Bluegills, bass and other pond fish find their metabolisms slowing as the temperature drops, causing them to become less active and to feed less often. They tend to stay in deeper water during the cold periods, away from the shoreline where the water temperature tends to fluctuate more widly. During warm spells, fish become more active and range farther.

The smaller invertebrates cope with winter in a variety of ways. Like fish, many of them have less energy—this includes the ferocious, finger-sized dragonfly and damselfly nymphs as well as some microscopic plankton. Rotifers, a zooplankton species, produce winter eggs with thicker walls in preparation for winter. For some zooplankton, winter is the best of times. These species have evolved adaptations by which they can take advantage of the general lethargy of predators. Unlike most creatures in the pond, they remain fairly active and even reproduce, feeding, growing and maturing throughout the winter months. With fish and other predators less active, more of these zooplankton will survive.

Most of the animals that enlivened the pond surface in summer are missing now. Frogs and turtles are overwintering at the pond bottom, waiting out the cold while breathing in special ways. Frogs have many blood vessels in their skin through which oxygen diffuses into their bloodstream. Turtles can survive weeks at the bottom of the pond by respiring gently through the cloaca, an opening at the rear of the turtle that acts like a gill. The bugs and beetles that buzzed and whined around the pond a few months ago have vanished. Many are dormant, sleeping the winter away until awakened by the first warm days of spring. Water striders fly away from the pond in winter, finding refuge beneath tree bark.

Without the fish and other prey creatures in the shallows, the herons are gone, but now mallards and other migrating ducks swim across the pond, tipping to get at submerged vegetation or the seeds and nuts that are laying on the pond bottom.

Warmblooded creatures are also guarding the flame of life during this harsh season. Beavers tend to stay in their lodges in winter, although they remain more active than most animals. An extra layer of fat and a thicker fur coat nurture the vital spark in beavers and also in muskrats, another active pond inhabitant. And by huddling together in their lodges with other members of their families, beavers can increase their warmth, one of the many fascinating ways that life is maintained in the winter pond.

# December Doves

*The best dove shooting is in September, right? Not necessarily, and here's how and why you should try again the second half of the season.*

*written and photographed by Curtis Wooten*

The frost, white as a light snow, hung heavily on the grass and weeds that covered the field road, collecting on our boots with every step. At first light the temperature hovered in the mid-20's, numbing the cheeks and creating a cloud of vapor with each breath. To the east, a crimson sky signaled a rapidly approaching sunrise.

It was the kind of morning that thousands of North Carolina sportsmen find memorable. On other mornings, I had participated from the confines of a blind overlooking a duck marsh, from the elevated perch of a deer stand, or hearing the yelps of beagles hot on the trail of a cottontail. But those were not on the list this morning.

In the gathering light, gray forms flushed from the pine trees that bordered the large corn field where we walked, and whistled their way toward the middle of the field to settle. We quickened our pace to take positions in the little cover available—I among a patch of "partridge pea" and broom sedge that guarded an old, weathered hand pump, and my brother, Alfred, a hundred yards away, crouched in a drainage ditch whose banks had been shorn of their cover.

More gray forms appeared on the horizon, making their way to the middle of the field in smooth, even wingbeats, and settled in. I glanced at my watch and to the east. Legal shooting hours began half an hour before sunrise, and that time had arrived.

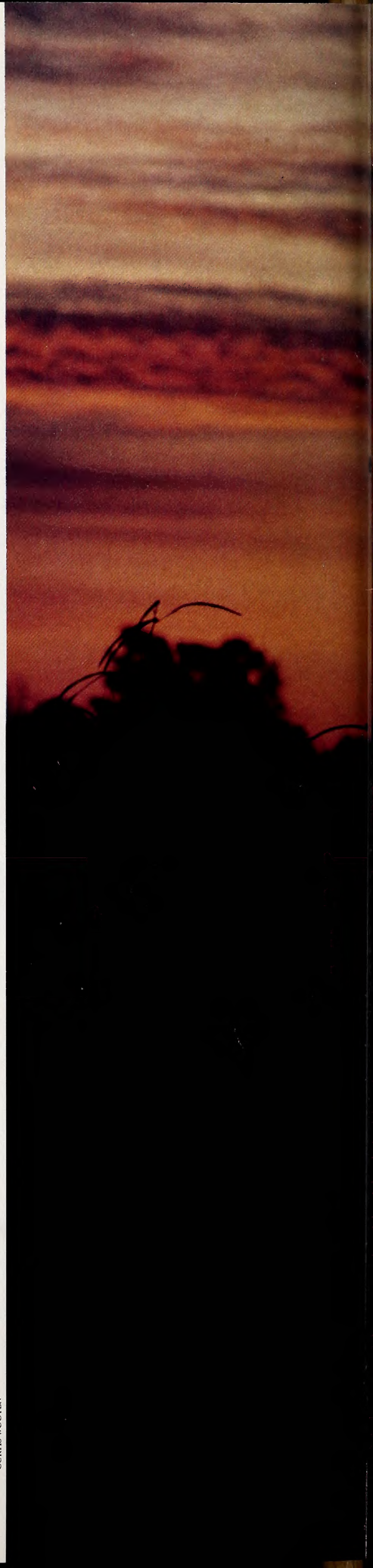
My eye caught the movement of two birds as they materialized above the tree-line and made their way briskly across the field, their path carrying them over Alfred's stand. At his shot, one of the birds folded, and the sky filled with hundreds of birds that had settled in to feed before our arrival.

For the next hour the sky worked with their numbers. A single here, a double there, and an intermittent flock of 10 or 15 reeling in on a rising wind. By 8:30 we nearly had our limits and called it a morning. After breakfast we planned to follow a brace of pointers and see what the bobwhites were up to.

This type of dove hunting is foreign to many North Carolina sportsmen. To most, dove hunting in the Carolinas is an early fall activity. Indeed, most dove hunting in North Carolina occurs during September, and mostly in the afternoon. The early dove season always heralds the opening of the fall hunting season and sportsmen, anxious to get the season underway, flock to farmlands in droves often nearly as large as the flocks of doves they pursue. By far the bulk of the doves taken here have bitten the dust by mid-September.

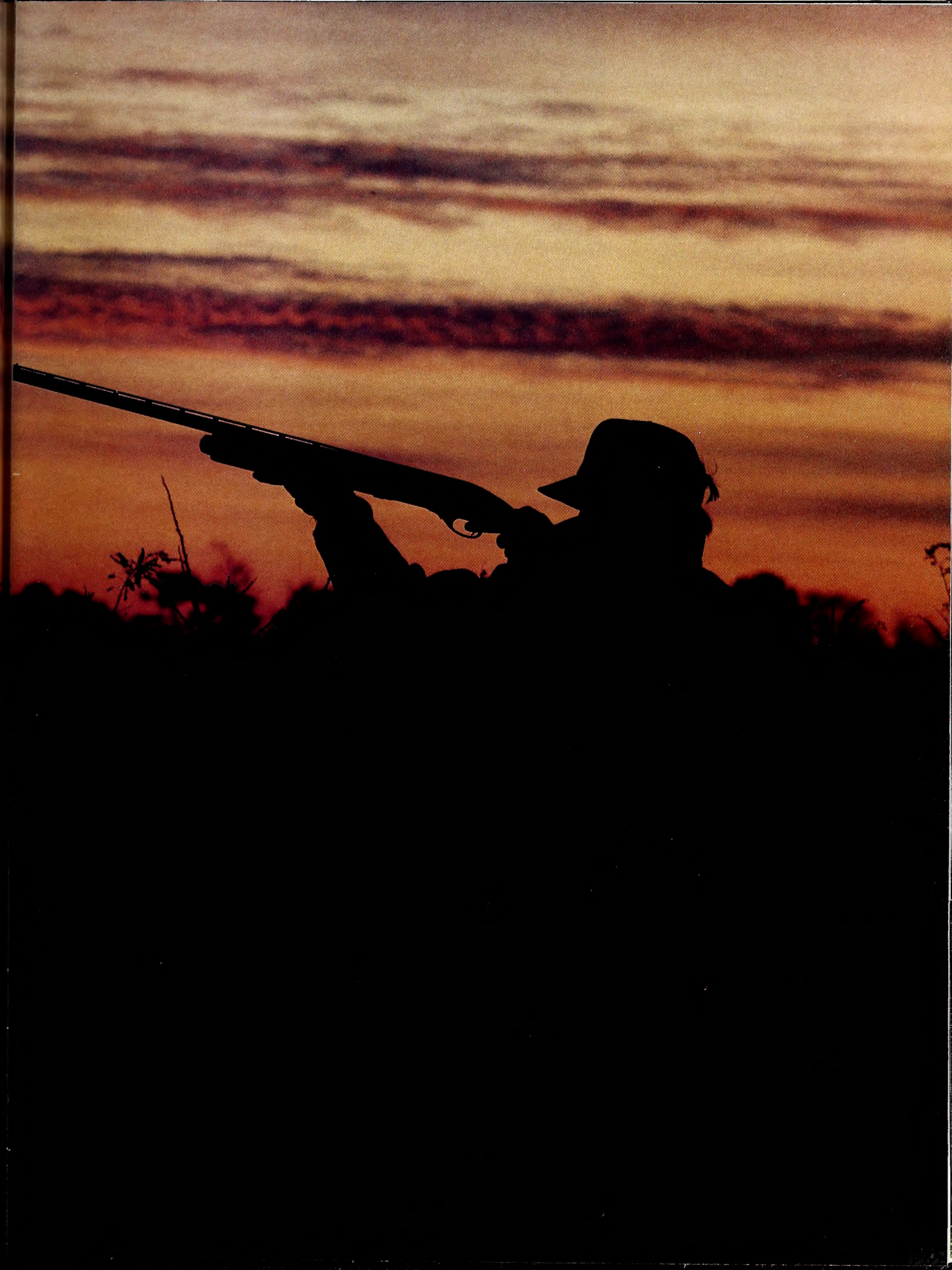
Under heavy gunning pressure and spurred by their migratory instinct, the native birds that frequent grainfields in September move south with the first cool snap. By October doves in huntable numbers are a rarity in Carolina. That's about the time the first portion of the dove hunting season closes. Dove guns are oiled and put on the rack and the sportsman's attention is diverted to deer, quail, rabbits and the like.

But that's not the end of it. As our native birds wing their way into the deep South, their northern brethren are also getting



***Shooting is** sometimes good early in the morning during the second half of the dove season, and you can begin 30 minutes before sunrise.*

CURTIS WOOTEN



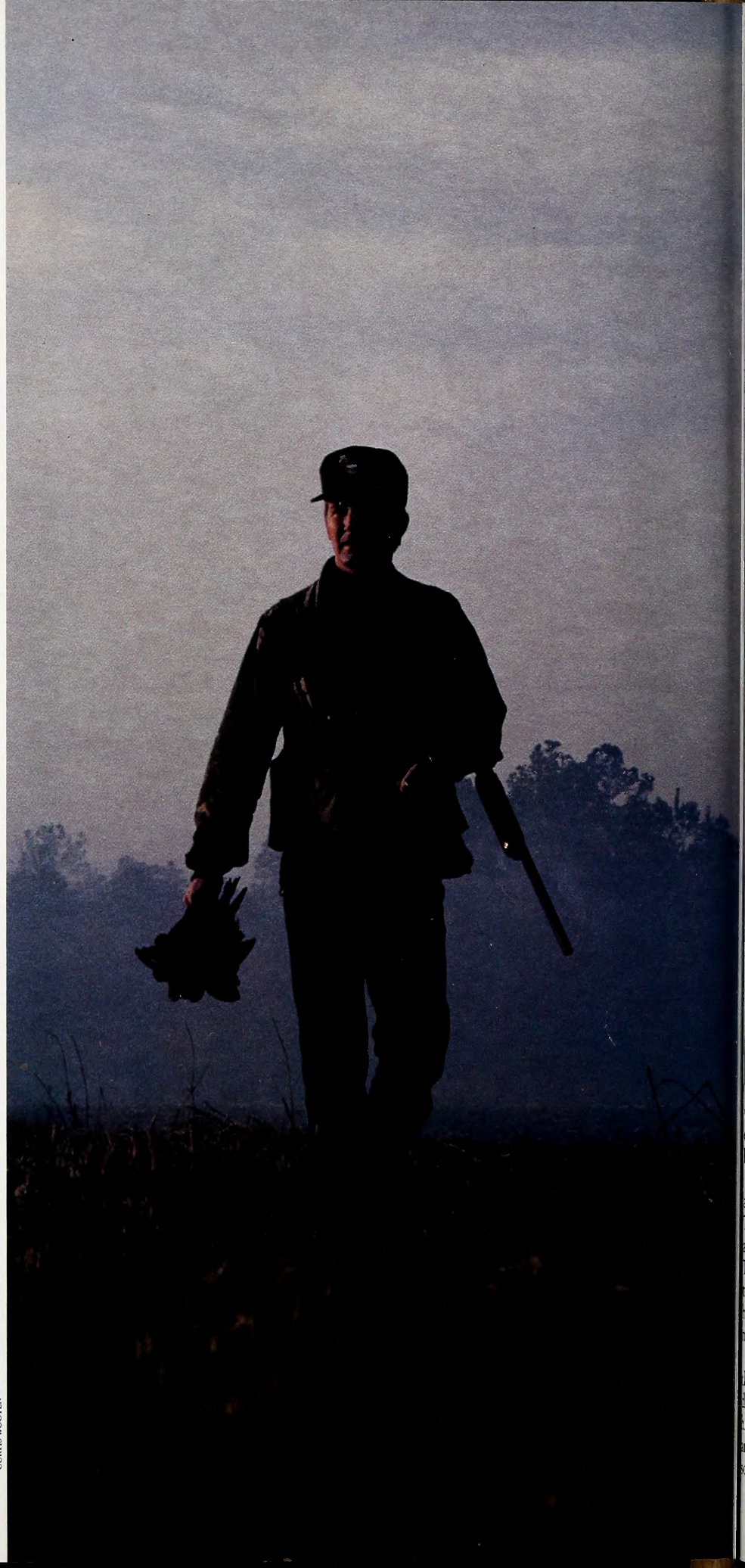
# December Doves

edgy and begin their southward migration. By mid-November sizeable flocks can again be seen over Carolina grainfields. As the weather worsens up North, the numbers of northern migrants increase here. They settle into pine trees around the stands of deer hunters in the late afternoon and rise by the hundreds in front of pointers traversing sun-drenched afternoon fields in search of quail.

There are several advantages to hunting these late arrivals. Besides an abundance of doves and relatively little competition, hunters will often find farmers more receptive to requests to hunt their property. Landowners skeptical of the legion of early-season dove hunters are much more likely to welcome small parties of winter hunters. And since the late dove season coincides with other small game seasons there is the opportunity to take quail and rabbits as well. Also, when temperatures are cool and crowds are small it's much easier to work a retriever (late season dove hunting is an excellent way to fine-tune a retriever for the ducks that are also now arriving in numbers). Finally, the lack of heavy gunning pressure can mean more consistent shooting. If a feeding field is hunted with prudence, it will continue to hold birds throughout the late season, although birds do tend to leave a hunted area more readily than they did in September.

As in September, the key to finding winter doves is to locate their feeding and roosting areas. Food preferences change little over the fall and winter months. Harvested corn fields, where they pick up scattered corn and weed seeds, seem to be used most consistently, but doves also work soybean fields to a lesser extent. They will often concentrate on sunflower, milo and millet fields when they are available.

Though the birds' food preferences are constant from fall to winter, the availability of these grains and weed seeds may be altered significantly, a fact that can work to the advantage of the late-season hunter. The trend toward fall plowing of harvested grainfields unfortunately eliminates many potential feeding areas for doves and other



***Al Wooten** crosses a field with several doves he bagged during a December dove hunt. Late season hunts usually involve only one or two hunters because just about everyone has switched from doves to other game.*

CURTIS WOOTEN

GENE HESTER

***One difference*** *in late season hunting is that the doves are often far more wary than they were during the first few days of the early season. Blinds and decoys can help.*

***Decoys strung*** *in a tree or on a powerline really work. A crude blind is also a good idea, and you can even bring your own portable "tree" to hang the decoys in.*

CURTIS WOOTEN

wildlife. Those fields left unturned, however, are more likely to attract doves, and hunters have an easier time finding them.

Strategy for hunting late season doves is a bit different from early season hunting. The mature doves found here in December are more wary than early season immatures. They are faster, more agile and know how to turn on a burst of speed that leaves hunters baffled and shot-shell manufacturers smiling.

A friend of mine hunts doves during the late season much the same as he does ducks. He rises before dawn to conceal himself in a field before the birds begin arriving to feed. His blind isn't nearly so sophisticated as a duck blind, but is more substantial than anything he uses during September hunts. He takes a half-dozen tobacco sticks (though any 4-foot stake would do) with him to the middle of the field he plans to hunt, pounds them into the ground to form a rectangle, weaves three strands of cord around the stakes, and then braids corn stalks, or whatever is available, into the cord to make the blind. He then lays out a spread of a half-dozen dove decoys on the ground near his blind to ease the suspicions of wary birds and puts two or three more in a nearby tree. He says that dove trees are undependable, meaning they are seldom where you need them, particularly in expansive Carolina grainfields. His solution is innovative: he carries his own tree. It's a 15-foot piece of ¾-inch aluminum conduit with a pair of 3-foot "limbs" (dowels) sticking out near the top. Decoys attached to the limbs easily attract live birds winging into the field for a morning meal. The set-up is simple, and it takes less than 15 minutes to put out the decoys and build the blind. It's also equally effective in early morning or mid-afternoon.

Of course, it's not necessary to go to this much trouble for good late-season dove shooting. Many hunters effectively hunker beside fence lines, on ditch banks and along power lines in the middle of harvested grainfields, and still take a limit of doves. Others position themselves between feeding and resting areas and take their birds by pass shooting. Whatever the strategy, late-season dove hunting offers excellent wingshooting that is too often overlooked. The season opens Monday, December 19, and extends through January 10. Shooting hours during the late season are from one-half hour before sunrise until sunset, and the daily bag limit is 12 birds. ⊠

## Grilled Doves And Herbs

Doves are tender and succulent, and can be prepared for the table in a variety of ways. If you haven't a favorite recipe, consider this one:

*¼ cup olive oil*
*2 cloves garlic, or ½ teaspoon garlic powder*
*1 teaspoon dried rosemary, crumbled*
*salt and pepper (to taste)*
*6 doves, split down back & flattened, or 6 dove breasts*

Mix the oil, garlic, rosemary, pepper and salt and brush over both sides of the birds. Grill 3-5 inches over hot coals for four to eight minutes per side, depending upon the degree of doneness desired, basting several times with the oil mixture. Dove breasts are tender and moist when cooked to a hot-pink center, which takes about four minutes on each side. Don't overcook!

Figure two to three dove breasts per person for normal appetites—four to six breasts for dove hunters at the end of a day afield. Serve alongside a bed of wild rice, broccoli or asparagus.

# PEOPLE IN THE PINES

## The Sandhills region is unique in this state, but its longleaf pine ecology barely resembles what was here originally.

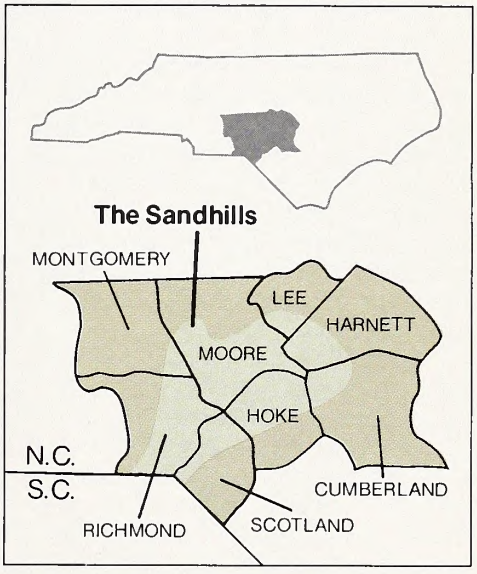
written and photographed by Jane Rohling

On very old maps of North Carolina, sandwiched between the Piedmont and the Coastal Plain, there is an area simply labeled, "Pine Barrens." This was desolate country covered with tall pines and deep sand. It was said by some that "the land was good only to hold the surface of the world together."

The Pine Barrens was a place that most of the early travelers, and even the Indians, seemed to avoid. They chose to travel instead where there was better forage for their horses and where their wagon wheels didn't get mired in the sand. They chose to settle and farm on the richer soils of the Piedmont and the Coastal Plain. And they chose to hunt in the hardwood forests where game was more plentiful.

It wasn't until shortly before the Revolution that a flood of Highland Scot immigrants settled in what is now Cumberland and Moore Counties. Their decision to settle in the Sandhills could hardly have been one of choice. The more fertile lands to the north, east and west had already been taken. So they stayed, possibly seeing in the sterile soils of the Pine Barrens a future that was at least less destitute than what they had left behind in their native land.

Most of these immigrants farmed small tracts of land, but some turned to the pine forests for their livelihood. Beginning in the early 1700s, the longleaf forests that covered all of the southeastern Coastal Plain were exploited for ships timbers and naval stores.




However, the industry in the Sandhills was hampered at first by the lack of good roads to transport the heavy barrels of tar and turpentine to market. It wasn't until the second half of the 19th century, when a plank road was built and railroads pushed into the Sandhills, that production of naval stores became the area's second largest industry.

Few of the trees that escaped being bled for turpentine or burned for tar escaped the axe. Intensive lumbering stripped the land of its majestic pines so quickly that by 1900 the lumbering business had died down significantly, and by 1940 it had almost come to a halt. By 1929, the naval stores industry had also declined to the point that a publication entitled "N.C. Resources and Industries" didn't even mention it.

During the heyday of the lumber and naval stores industries, a very different industry was getting its start in the Sandhills. As early as 1817, summer visitors had begun to travel to Jackson's Spring for the supposed

***The Sandhills Game Land** has been a popular place to hold bird-dog field trials for many years. A lesser known attraction, however, is a number of unique natural communities that harbor endangered plants and animals.*

medicinal qualities of its mineral water. But it was not until the 1880s that an enterprising Tar Heel, John T. Patrick, began to promote the Sandhills in northern newspapers as "a refuge for those who wish to escape the Northern blizzard." He even published a statement from a New York doctor who had come to the Sandhills suffering from tuberculosis, saying that the Sandhills' climate had improved his condition.

In 1884, Patrick laid out the resort town which became Southern Pines. Between 1886 and 1900, other entrepreneurs purchased property in the Sandhills which grew quickly into the fashionable resort communities of Pinehurst and Pinebluff. Soon they began to promote the Sandhills as a vacation resort. Many recreational activities, including hay rides, concerts, croquet and lawn tennis were available to guests. In 1897, an employee of the Pinehurst Dairy burst into the office of James Tufts, owner of the Holly Inn, complaining that a guest was hitting the cows with a little white ball. A year later, Pinehurst had its first golf course and a Sandhills tradition had begun.

Next to golf, the Sandhills may be best known today as a center for all kinds of equestrian sports. Riding to the hounds in pursuit of the wily fox is a sport that has its roots in the very earliest Sandhills tradition, and the popularity of the region for quail hunting has brought dog handlers on horseback to the Wildlife Commission's Sandhills field trial grounds for years. The Stoneybrook Steeplechase has been a rite of spring in Southern Pines for almost half a century, and polo has been played here since 1911.

Being a horse-lover from way back, I was curious about what makes the Sandhills so attractive to horse owners and trainers, so I asked Melanie Wyatt, owner of the Foxtrack Training Center in Southern Pines. She has been training thoroughbred racehorses there for several years.

"One of the reasons the Sandhills area is so popular among horse people is that there are so many top people in so many types of equestrian events in this area," she told me. "Horses can train here virtually all year long. It almost never freezes and the mean annual temperature is about 61 degrees. Even during the summer, it's not too hot to train early in the morning, and on the coldest winter days it usually gets warm enough to train in the afternoon sun.

"The soft sand is easy on the horses' hooves, and helps avoid injuries during training," Wyatt continued. "I can often keep horses barefoot until they're over a year old. They'd have to be shod much earlier in most places."

***Inverted, V-shaped scars*** *in longleaf pine trees are the legacy of a naval stores industry which thrived in the Sandhills from the early 1700s until the beginning of this century. Sap was collected from the cuts and distilled into turpentine and rosin which were used in shipbuilding and other industries.*

Farmers, turpentine-distillers, lumbermen, tuberculosis-sufferers, golf players and horse trainers—over the past 200 years they've all come to the Sandhills looking for something in this unique environment. But 200 years of human habitation has left scars on the land that may never heal. The vegetation has undergone drastic changes. Today, very few areas even resemble the original longleaf pine savannas that once dominated the region. And we have few written or visual reminders to tell us what they were like.

Jay Carter is an ecologist who has been studying the Sandhills for over 20 years. He has come to be widely respected as one of the foremost authorities on Sandhills ecosystems. Yet, he'll be the first to admit there's a lot we don't know about them.

"The various plant communities that make up the Sandhills are extremely sensitive to disturbance or manipulation by man," Carter said. "All of the Sandhills have been severely impacted by human activities in the last hundred years. There is no longer anywhere you can say is truly untouched. It's certainly one of the great losses to science that the longleaf pine ecosystem, which was one of the most extensive ecosystems in North America, was annihilated and nobody took notice."

Although the original longleaf pine community covered about 60 million acres in the southeastern Coastal Plain, the Sandhills, as a distinct physiographic region, was much smaller. In North Carolina, the Sandhills is roughly one tenth the size of the Coastal Plain. To distinguish one from the other you have to look at the geology. For that part of the story I was referred to Dick Thomas, a State Park naturalist at Weymouth Woods Sandhills Nature Preserve in Southern Pines. He explained that many people are confused about the exact definition of the Sandhills because of the erosional nature of the formation.

Technically, the term "sandhills" refers to the surface sands of the Pinehurst Formation. This formation was once much more extensive than it is today—possibly even connecting with the New Jersey Pine Barrens. But now much of it has disappeared because of erosional activity. What's left today is found on top of ridges or interstream divides between the Piedmont and Coastal Plain. It is missing from many of the bottomland areas where the streams and rivers that transect the Sandhills have eroded the sands away.

Little is known about the origin or age of the Pinehurst Formation. Geologists have differing opinions of the matter. But in spite of these unknowns, the geology has played an important part in the history of the Sandhills. These surficial sands are largely responsible for the fact that the longleaf pine forests remained here long after they disappeared from the Coastal Plain.

"The sands are very sterile. Because farming these poor, droughty soils was largely unsuccessful, much of the area was allowed to regenerate into longleaf pine rather than being clear cut and converted to fields," Thomas informed me. Today, we have a few hundred acres of longleaf forests that are in a relatively natural condition.

Originally, the dry, sandy ridges were dominated by open pine savannahs. The large old longleaf pines *(Pinus palustris)*, some of them 300-400 years old, grew more densely than they do today, yet the forest was very open. There were very few turkey oaks *(Quercus laevis)* in the understory and the ground was covered by dense tufts of wiregrass *(Aristida stricta)*. On better soils bluejack *(Q. incana)*, blackjack

**A mild climate** *and a strong interest in equestrian sports have made the Sandhills a mecca for horse trainers. Although early settlers avoided the Sandhills because of the lack of natural forage for horses and livestock, introduced Coastal Bermuda grass grows well in the dry, nutrient-poor soils.*

***Peaches have been grown*** *in the Sandhills since the late 1700s, but after approximately 20 years the soils are usually exhausted and the orchards become unproductive. Within a few years, abandoned peach orchards are invaded by native longleaf pines.*

***Wildlife Commission** biologist Terry Sharpe searches for insect-eating pitcher plants in a Sandhills bog. Hot summer fires prevent invasion by hardwood trees, and allow a wide variety of grasses, sedges, ferns, orchids and other wildflowers to flourish in this unique community.*

***Fire is** as much a part of the Sandhills as the land itself. The Wildlife Commission uses controlled burns to improve wildlife habitat and to maintain the land in towering longleaf pines and tawny wiregrass.*

# PEOPLE IN THE PINES

*(Q. marilandica)*, and scrubby post oaks *(Q. margaretta)* may also be found in the understory. Aside from these, there were very few shrubs and just a few drought- and fire-resistant herbs—many of them legumes and composites.

Scattered throughout the region are places where clay subsoils lie just beneath the sandy surface, or outcrop on the side of a slope. These clay lenses can become water-saturated, but they're also water impermeable.

"The water will soak through the sand and hit these layers and flow parallel out the sides of the hills," Carter explained, "creating what some people call 'hanging branches.'" Boggy wetland plant communities develop on these sites.

I visited one of these hillside seeps with Terry Sharpe, a Wildlife Commission biologist who has spent a lot of time in the Sandhills, and is very familiar with the plants and animals that make this area so unique.

The vegetation is a lot more diverse on the wet sites than on the dry ridges. The longleaf pines are often replaced by pond pines *(P. serotina)*, and a variety of evergreen shrubs, many of them common in the shrub pocosins of the Coastal Plain, have migrated inland to reside in these bogs. Where frequent fires control the shrubs, many species of grasses and sedges can be found as well as a rich assortment of wildflowers—among them orchids, lilies, pitcher plants, goldenrods and asters. They lend color to the Sandhills from March to November.

Whether wet or dry, the Sandhills plant communities have one thing in common—they are all inextricably linked to fire and have evolved a wide variety of adaptations to cope with it (see "Fire and Wildlife," *Wildlife In North Carolina*, November 1982). The original longleaf forests probably burned

every three to five years. Fires were usually ignited by lightning during summer thunderstorms and often swept rapidly over large areas, stopping only at natural barriers such as lakes and rivers. The longleaf pine forest is a climax community, capable of maintaining itself indefinitely—as long as the soil, climate and fire cycles remain unchanged. But once the fires are suppressed or the cycle is altered, the mix of plant species begins to change.

This is where we came in. Ever since man first came to the Sandhills, he has tampered with the fire cycle—putting out fires or setting them to suit his needs, without regard to how this affects the rest of the ecosystem. The result has been drastic, possibly irreversible changes in the vegetation.

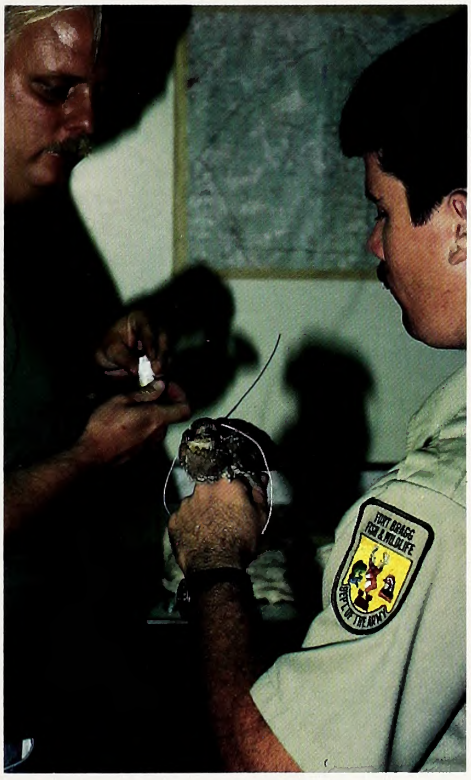
In most cases, controlled burning has been done during the late winter or early spring—the purpose being to stimulate growth of livestock forage, suppress brushy growth, or reduce the accumulation of litter, which builds up to become a fire hazard. While winter burning is preferable to none at all, it does not have the same effect on the vegetation that natural summer burning did. Winter and early spring fires kill autumn-germinated longleaf pines and occur too early to trigger natural flowering and seed production in species whose reproduction is timed to take advantage of the natural fire cycle. And they aren't nearly as effective as the hotter summer fires for controlling the hardwood encroachment.

Furthermore, when an area is burned during the winter, the nutrients released in the ash tend to leach through the upper soil horizon while the plants are still dormant, and so are lost. By burning in the early summer, when the plants are already actively growing, those nutrients are recycled immediately. It's possible to go out a day after a burn and see plants sprouting out of the ashes.

The preservation of the natural Sandhills plant communities will only be possible if fire is restored to the system. Oddly enough, the best examples we have today of what the primeval savannas and their associated wetlands looked like can be found in the impact zones on Fort Bragg where the area is frequently burned during artillery practice.

This is the kind of place Carter really gets excited about. "The plant diversity there is out of sight," he says. "Every time I go out there I find something else that's fairly spectacular." Sharpe has had a similar experience on a small tract of the Wildlife Commission's Sandhills Game Land that he has been burning annually during the summer for the past few years.

So, by accident and through experimentation, we are gradually learning how fire controls the Sandhills ecosystem, and eventually this may help us to preserve or restore some of these disappearing communities. But in areas where human activities have disturbed the soil, we will probably not be so lucky. Once the groundcover has been destroyed many of the native plants disappear. We don't know why, and we don't know how—or if— we can ever get them back. Because of physical or chemical changes in the soil, or siltation, irreversible successional changes take place, and the original community is gone forever.



***N.C. State Researcher** Paul Curtis and Fort Bragg Wildlife Biologist Don Cockman attach a radio transmitter to a quail. Their research has disclosed that the highest quail populations on the base are found on the edge of artillery ranges which burn after frequent shelling.*

With such drastic changes in vegetation, it has to be expected that the wildlife will be affected also.

"You're wondering where all the bobwhite quail went?" Carter asked. "Well, most of the quail they've got left on Fort Bragg are on their impact areas. And so are the highest densities of red-cockaded woodpeckers and deer. Why?

"One of the reasons is that it's one of the most natural community types left. So that's where the greatest concentrations of native wildlife are."

Carter has been studying red-cockaded woodpeckers in the Sandhills since 1965. This small woodpecker evolved in the open pine savannas, and it has had problems adapting to the changes in its habitat. As a result, it is now listed as a federally endangered species. The changes in vegetation have affected the birds' foraging and nesting behavior, and have also introduced new predators and competitors.

Red-bellied woodpeckers and flying squirrels, both of which compete with red-cockaded woodpeckers for cavity sites, have grown more abundant along with the increase of hardwood trees in the Sandhills. The negative effect these two species have had on the reproduction of the red-cockaded woodpeckers has been well documented.

"The fox squirrel is a species of the longleaf pine forest, also," Carter went on. "But once an area starts to grow up in hardwoods, even if the pine forest is still there, you begin to get more gray squirrels, and the two species do not get along well. So, again, you have a native species that's being replaced by a species that's not native, at least not to these specific sites."

There are a lot of things we still don't know about the complex interactions between wildlife, vegetation, soils, climate and fires in the Sandhills. There are currently several research projects being conducted by the U.S. Army, the Wildlife Commission, and several area universities which may reveal some of the answers to our questions. Once we have more answers, we will be better able to develop management plans to preserve—or restore—some of these disappearing ecosystems. Most of this work will have to be carried out on public land, but perhaps private landowners and developers will become interested in lending a hand as well.

Ironically, many people came to the Sandhills because they enjoyed the beauty of the longleaf pines, but they're not planting them. Most people are landscaping their yards with ornamental hardwoods or non-native pines. So, as existing longleaf pines die or are cut down, they are not being replaced.

"It's really kind of tragic in a way," Carter mused. "You've got people paying good money to destroy things that occur here naturally, and then they turn around and pay more good money to have somebody plant something very similar back in their yards again.

"The U.S. Forest Service and the State Forest Service and forestry schools have spent I don't know how much money trying to find ways to get rid of this native vegetation. They consider it worthless. Nobody's spent any money trying to figure out how to get it back. And it makes preserving what you've got that much more important, because you've got less all the time." ⊠

# Phantoms Of The Pinelands

Fox squirrels are the largest tree squirrels in the western hemisphere, and scientists are trying to learn more about these handsome North Carolina natives.

by Dr. Peter D. Weigl and Terry S. Sharpe

TERRY SHANKLE

***Young fox squirrels** are measured, weighed, and tagged to learn more about their life cycle. Here, Terry Sharpe (left) and Dr. Peter Weigl examine two of the animals before returning them to the nest.*

Nothing in my years of research on wild animals had adequately prepared me for that crisp November morning in the Sandhills almost nine years ago when I encountered my first North Carolina fox squirrel. Over the years I had worked with a variety of squirrel species in other parts of the country. I had read the proper scientific literature (I thought), had listened to the lore of foresters and hunters, and had even had a glimpse of something big and squirrel-like disappearing among the pines of a Brunswick County forest.

So, I was not especially excited that morning as N.C. Wildlife Resources Commission biologist and co-author Terry Sharpe and I unfastened an unusually heavy nest-box from an old pine and lugged it to a cage nearby. A few shakes of the box set off an explosion into the cage and there, scolding and shaking with indignant rage was the most spectacular squirrel I had ever seen. It was huge—long of body and tail—and beautifully colored—light gray with a black mask and white nose, ears and feet. My astonishment turned to curiosity following this capture and a few others during the next few days.

If this was a common squirrel and a game animal of the southeastern coastal plain, why hadn't my training, reading, and discussions with other biologists prepared me for what I saw in that cage that morning? I went back to the scientific literature, but it consisted of only one old study from Florida, a few short papers from Maryland and Louisiana, and some intriguing historical documents. I questioned biologists, foresters, and academics; but, while there was abundant information on gray squirrels and western fox squirrels, no one seemed to know anything about the southeastern fox squirrel.

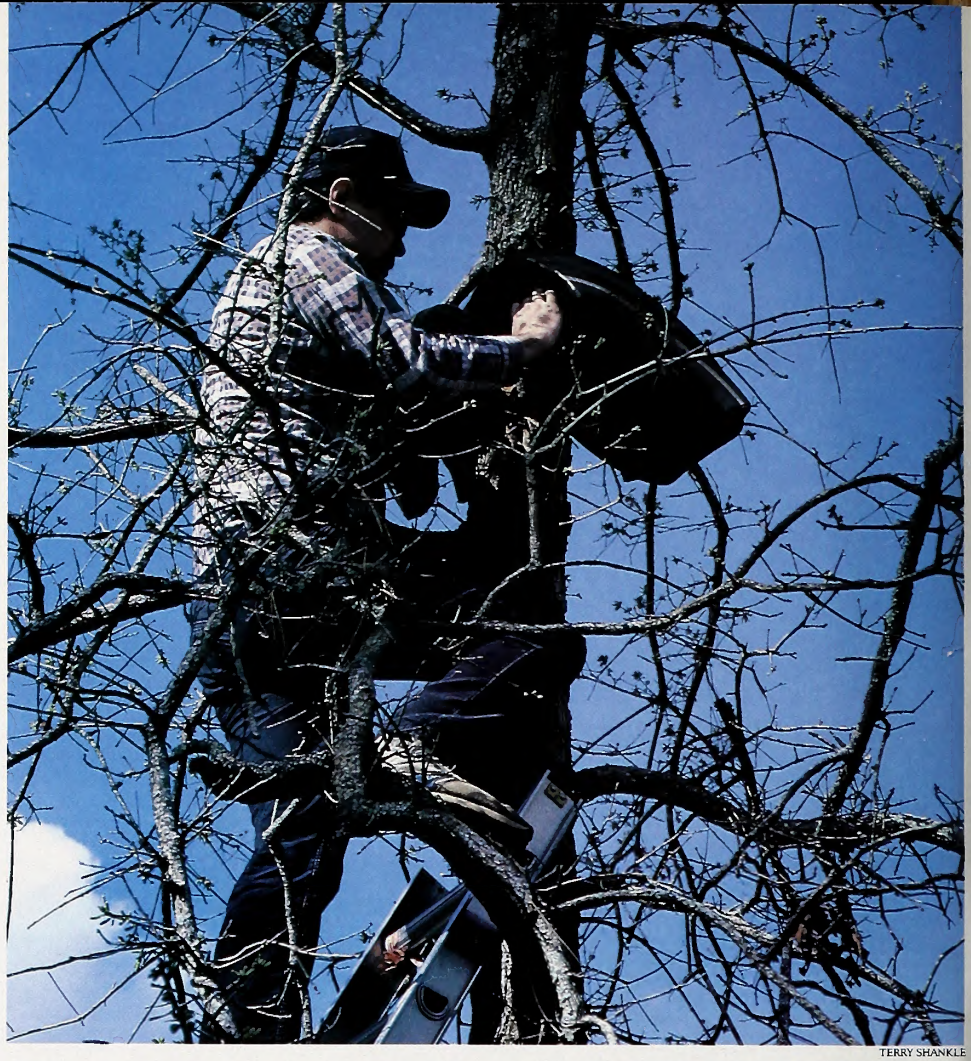
This mysterious absence of information became such a source of curiosity and even aggravation that Terry and I eventually became hooked on the problem. Thus, with a small group of dedicated graduate students we have spent the last nine years trying to unravel the complexities of this unknown squirrel's ecology and public image. Though our studies have involved visits to museum collections, years of fieldwork, and intricate laboratory procedures, nothing has surpassed the first impressions of the magnificent animal which started this whole quest.

Eastern fox squirrels are the largest tree squirrels of the western hemisphere and the most variably colored mammals in North America. Although a single species, fox squirrels can generally be assigned to two major groups on the basis of body and ecological characteristics. The fox squirrels of the Atlantic and Gulf coastal plains are very large, up to 3 pounds in weight, and strikingly colored—silver, gray, black—often with black masks and distinctive white markings. They are mostly confined to open, mature pine-oak and other forests from the Delmarva area to the Mississippi floodplain. Western fox squirrels are smaller, usually a little under 2 pounds, reddish in color, and occupy open deciduous and prairie-edge habitats west of the Appalachians and from Minnesota to Mexico.

Eastern fox squirrels have been known since early colonial times. They occupied the great coastal forests that provided the necessary pitch, tar, and wood products much in demand by the British and American navies and were described and sketched by America's early naturalists such as Catesby and Audubon. But in spite of this early fame they were largely forgotten in later years while the squirrels of the west, though discovered much later, have been the subject of extensive study. And while the western fox squirrels prospered and, over the last century, extended their range to the Rockies, many of the populations in the east disappeared from their former haunts and have been accorded "endangered" or "threatened" status.

Our studies have produced a growing conviction that the fox squirrel's predicament and biology are intimately associated with the special characteristics of its habitat. Although these squirrels enter and use many of the vegetation types of the Coastal Plain, they are most abundant in or near open, mature pine-oak forests, especially the longleaf pine-oak habitats which once covered large areas of the south. Maintained by frequent fires and tolerant of poor sandy soils, these forests consist of large, widely

***Fox squirrels** are native to the longleaf pine forests of the Southeastern Coastal Plain, and show more color variation than any other North American mammal. Common shades are coal black and white, gray or silver and white, and reddish.*



TERRY SHANKLE

***Nest box checks** provide information on reproduction. Fox squirrels bear one or two litters annually depending on the scarcity or abundance of pine mast, their primary food.*

spaced pines, a sparse understory of oaks and a discontinuous carpet of grasses and small plants. Such a forest provides only limited kinds of resources and these in a very patchy and highly variable fashion. Only a specially adapted animal could live in such an environment and exploit its diffuse, "feast or famine" conditions. The southeastern fox squirrel is such an animal and we believe that its natural history is a response to these habitat factors.

The two resources of greatest importance to the fox squirrel are food and nesting sites. While the climate of the southeastern Coastal Plain is generally mild and thus can somewhat compensate for fluctuating food supplies and suboptimal nests, the size and reproductive performance of populations seems closely linked to these two factors. In the fall and winter, fox squirrels live largely on a few kinds of acorns, supplementing their diet with other nuts, seeds, fruit and fungi. During the spring period when young are reared, squirrels use any remaining acorns from the previous autumn, but add a variety of seeds, bulbs, buds, flowers, fungi, and animal material such as insects. By mid-June the food supply has begun to decline and especially in dry, hot years, June and July are months of fasting, with animals often losing weight and condition.

Just when food supplies become most critical (in late July and August) the giant (almost one pound), green cones of the longleaf pine begin to ripen. These are cut from the branches, carried to a feeding site near the trunk, and eaten with great skill and vigor. The squirrels regain their lost weight and continue to feed heavily on longleaf seed until the fall acorn crop. During this annual food cycle the squirrels use a large number of different nests. While compact leaf nests and simple platforms of twigs and leaves are adequate, warm-weather refuges, many squirels search out hollow trees during the colder months and at the time of young rearing. Such nests not only provide greater insulation from wind and cold but also much better protection from such common predators as bobcats, raccoons and tree-climbing snakes. Since most hollows large enough for nests are in hardwoods, the presence of large oaks or access to bottomlands are particularly critical at certain times of year.

This very brief description of fox squirrel food and nesting habits provides a basis for explaining some of our unusual findings. One puzzling discovery was the consistent size differences between eastern and western fox squirrels. Why should eastern animals be larger? While we still don't know with any certainty, the following ideas may be advanced to help understand this phenomenon. First it is possible that the milder and often maritime climate of the Southeast has reduced the costs of staying warm in winter and thus permitted the evolution of the largest possible size relative to the food supply. Second, since southeastern fox squirrels must often cope with periods of local food shortage, the capacity of larger animals to carry proportionally more fat might also help them survive such lean times. Third, because most of their food trees do not produce good crops every year and because those crops are often very patchy in distribution, fox squirrels must often travel long distances to obtain food. And since their habitat consists of open forests with discontinuous canopies, they have to run along the ground. Larger body size has been found to be a great advantage in the speed and efficiency of such long-distance travel.

Finally, one food in particular, the longleaf pine cone, may have affected these squirrels' size. In studies of captive eastern and western fox squirrels and gray squirrels we noticed that while all experienced animals could extract seeds from longleaf cones, only the southern fox squirrels were large and strong enough to carry and rapidly process such massive cones. Since longleaf cones are a critical resource after a long period of food scarcity, they may have been a major factor in the evolution of the body size of their most avid consumer.

The fox squirrel's response to differing levels of food supply as well as special food sources is apparently central to understanding other aspects of its biology. Over an eight-year period we surveyed the acorn, pine cone and other food supplies at least three times a year and kept careful records on the numbers, weight, and reproductive performance of all squirrels taken from 500 nestboxes set out in two sections of North Carolina. No systematic population study had ever been carried out on the eastern fox squirrel before, and thus we were surprised at how precisely our estimates of food supplies at seasonal intervals allowed us to predict squirrel condition and reproductive output.

Good spring food levels followed by an abundant longleaf cone crop resulted in the

only major fall reproduction observed. A good acorn crop following a moderate cone harvest was linked with larger numbers of breeders, larger litters and reproduction at a younger age. On the other hand, low cone and acorn crops on three occasions resulted in little or no detectable breeding and low body weight. We could find no evidence of any female having more than one litter per year. In analyzing this modest and fluctuating reproductive rate, we were not surprised to discover that squirrel density on even our better study areas averaged less than 10 squirrels per 300 acres. This figure is well below those reported for almost all other tree squirrel species. Thus a habitat of low food diversity but mild climate has produced large, highly mobile squirrels with low reproductive rates and reproductive behavior closely related to the variable production of special foods.

Food supplies also seemed to affect squirrel behavior. On the basis of work with both captives and free-ranging animals we learned that southeastern fox squirrels were "loners" most of the time, and much more aggressive than either the western members of the species or the gray squirrel. With energy supplies often scarce and patchy, it is not surprising that, except during the breeding season, each animal travels independently through its habitat. By radiotracking animals we were able to determine just how much area squirrels use in the course of their activities. As one might expect, their ranges are among the largest known for any tree squirrel—up to 80 acres, all to meet their energy and reproductive needs.

Even their annual activity pattern seems linked to their food supply. While in good habitats squirrels are frequently observed most of the year, they seem to vanish during early summer. This is the time of meager food availability—after the spring "bloom" and before the time of cone ripening. Radiotracking has shown that animals often reduce their activity and range at such times and spend long periods in the nest. Is it possible that they are essentially "waiting out" a sizeable portion of these yearly "hard-times?" Predictably, just as the longleaf cones start to ripen, the squirrels suddenly reappear and spend hours each day in an orgy of feeding.

Having described fox squirrel form and biology as the products of habitat, it remains for us to return to the questions of benign neglect and progressive decline mentioned earlier. Why was the southeastern fox squirrel virtually forgotten after early years of fame and familiarity? One reason may be its occupation in the more remote and, to many people, the more forbidding forests of the Coastal Plain. Since most people settled in the Piedmont and along the coast they often became more familiar with the gray squirrel, an animal that better tolerates dense development. Another reason for the fox squirrel's obscurity is its built-in resistance to biological study. Eastern fox squirrels, unlike their western counterparts, are notoriously difficult to live-trap. They are so wary that long trapping periods are often required to obtain just a few animals. Our use of nestboxes was in part an attempt to cope with this excessive trap shyness.

TERRY SHANKLE

***Telemetry** or radio tracking studies show that the range of a fox squirrel may extend up to 80 acres, and the animals may spend most of their time sleeping when food is scarce.*

However, perhaps the greatest problem in studying these animals is apparent from our data. Any animal that has such low densities, huge home ranges, and the capacity to hole up at intervals or move on to greener pastures when conditions get tough is going to be a researcher's nightmare. Only a few fools hooked on these beautiful squirrels and their problems are going to spend nine years on such work, and it's a good thing we have other jobs to keep us alive in the meantime.

Given the fox squirrels' intricate dependence on certain habitats it is not surprising that its decline is associated with human activities which destroy its habitat, reduce its food supply, and favor its potential competitor, the gray squirrel. The mature open forests to which it is adapted have been reduced to mere remnants since the 19th century, and only the squirrel's mobility has permitted it to persist, running like a fugitive from area to area. Today many of the remaining pine-oak forests are being converted to developments, shopping centers, and golf courses. Other habitats are rendered unsuitable by the removal of the larger oaks through herbicide use or firewood cutters. The resulting pine monoculture lacks the necessary acorns and nesting sites for squirrels and many other game species. Finally, some forests have been protected from fire so long that they have grown into dense, closed-canopy jungles—just right for gray squirrels but not suitable for the larger species. The result of all this land modification, in combination with years of neglect, is local and regional extinction and the title "threatened" in wildlife publications.

Since that memorable capture in the Sandhills years ago, we have handled scores of fox squirrels and our admiration for these unusual animals has increased. When we catch an animal we tag it, take some additional data, and then have the pleasure of watching the graceful squirrel bound to freedom through the pines. Fortunately, fox squirrels are still common in parts of North Carolina and the Southeast and we hope that our data may help protect them. However we've come to realize that the fox squirrel is more than just another Coastal Plain inhabitant. It is an "indicator species" so closely tied to the forests of the region that its status to a large degree indicates the quality of these habitats for a whole array of other pineland animals. Let us hope, then, that we can preserve the fox squirrel, and all the beauty and diversity that surrounds it. ⊠

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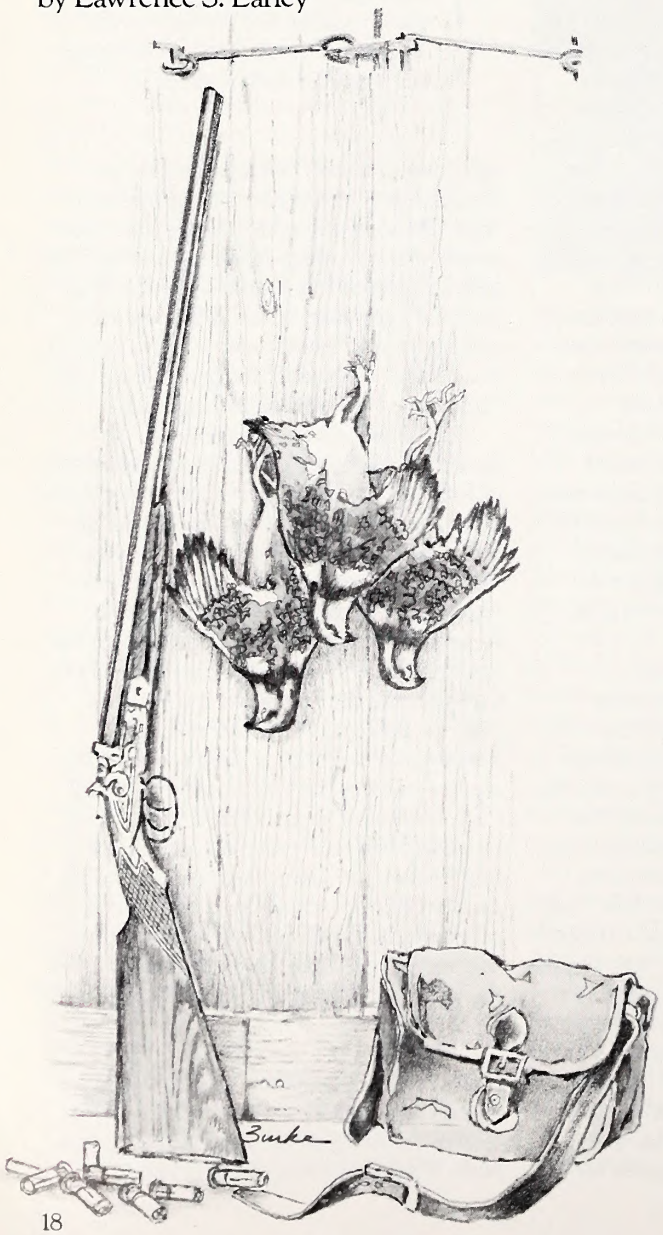
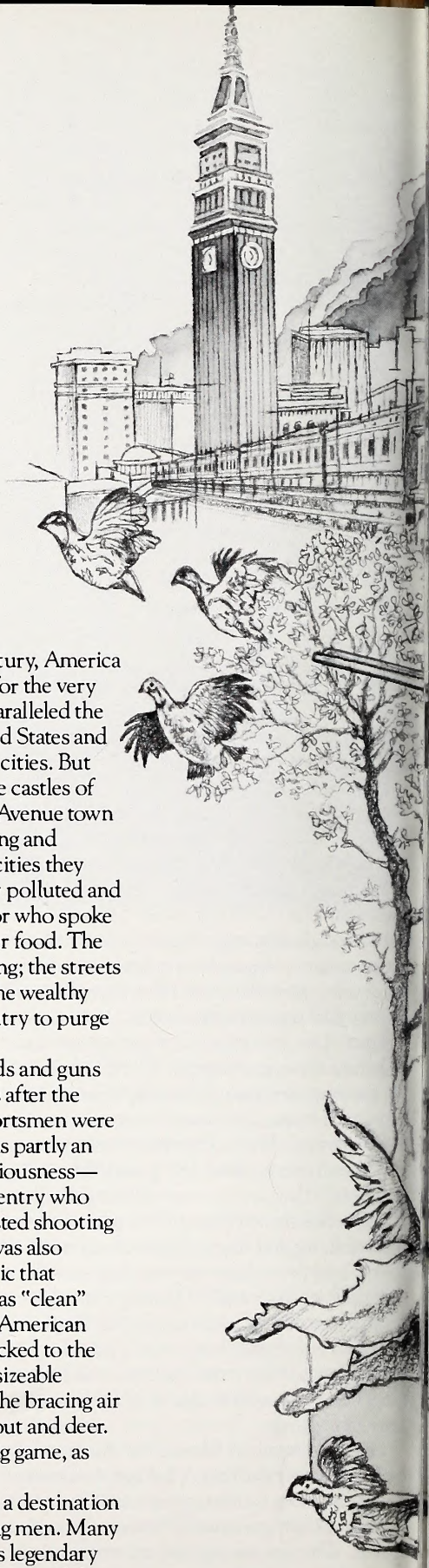
*Peter D. Weigl is professor of biology at Wake Forest University. Terry S. Sharpe is a district biologist, working in the Sandhills area, for the N.C. Wildlife Resources Commission.*

# Quail Paradise In The Piedmont

At the turn of the century, the habitat was perfect and the quail hunting fabulous. The combination attracted wealthy northern sportsmen who built elaborate sporting lodges in the Piedmont.

by Lawrence S. Earley



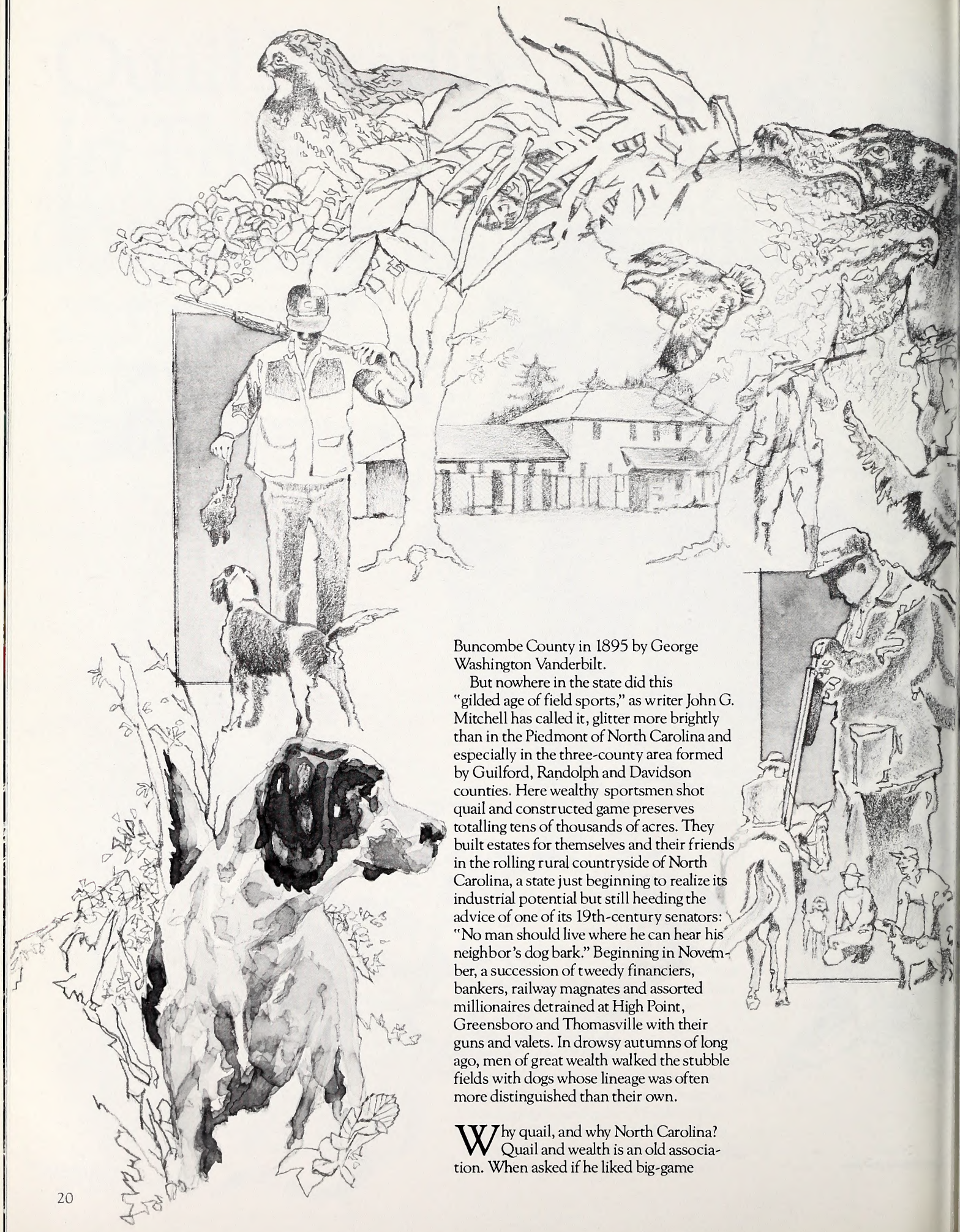


During the late 19th century, America became a playground for the very wealthy. These years paralleled the build-up of capital in the United States and the growth of the great eastern cities. But not content with ransacking the castles of Europe to decorate their Fifth Avenue town houses, the rich were discovering and celebrating the outdoors. The cities they built were growing increasingly polluted and populated with immigrant poor who spoke strange tongues and ate stranger food. The air was foul; the noise distressing; the streets were muddy and dangerous. The wealthy sought the clean air of the country to purge the poison of city life.

Often they brought their rods and guns with them. Indeed, in the years after the Civil War, bankers-turned-sportsmen were a phenomenon of the age. It was partly an expression of their class-consciousness—their models were the British gentry who owned country estates and hosted shooting parties. But the outdoor urge was also stirred by a homegrown rhetoric that celebrated hunting and fishing as "clean" and "natural," as red-blooded American sport. In response, the rich flocked to the Adirondacks where they built sizeable hunting camps. They enjoyed the bracing air of the Catskills while taking trout and deer. They went out west to shoot big game, as Theodore Roosevelt did.

North Carolina also became a destination for this restless tribe of sporting men. Many found their ways to Currituck's legendary marshes, building shooting clubs amid the wintering ducks and geese. Probably the most excessive monument to the northern urge to colonize the empty Southern spaces was Biltmore, constructed in the hills of

ILLUSTRATIONS BY JERRY BURKE



Buncombe County in 1895 by George Washington Vanderbilt.

But nowhere in the state did this "gilded age of field sports," as writer John G. Mitchell has called it, glitter more brightly than in the Piedmont of North Carolina and especially in the three-county area formed by Guilford, Randolph and Davidson counties. Here wealthy sportsmen shot quail and constructed game preserves totalling tens of thousands of acres. They built estates for themselves and their friends in the rolling rural countryside of North Carolina, a state just beginning to realize its industrial potential but still heeding the advice of one of its 19th-century senators: "No man should live where he can hear his neighbor's dog bark." Beginning in November, a succession of tweedy financiers, bankers, railway magnates and assorted millionaires detrained at High Point, Greensboro and Thomasville with their guns and valets. In drowsy autumns of long ago, men of great wealth walked the stubble fields with dogs whose lineage was often more distinguished than their own.

Why quail, and why North Carolina? Quail and wealth is an old association. When asked if he liked big-game

hunting, J.P. Morgan Jr. is said to have replied, "One shot fells too much meat—wing shooting for sport." This attitude was probably common among many wealthy men, north and south, who shot quail. The bird itself certainly isn't large—a few ounces of meat, feathers and bones—but the appeal of quail hunting, like fly fishing for trout, lay much more in symbolic terrain, in matters of style—it was how you hunted and the meanings in the hunt that mattered most. One outdoor writer in 1916 found in his pointer a symbol for behavior: "All day long," he wrote, "the hunter has before him a living example of strength, of perseverance, of good faith, of self restraint, all the cardinal virtues of good sportsmanship." He was writing about quail dogs, but he was summarizing the personal virtues his class held dear.

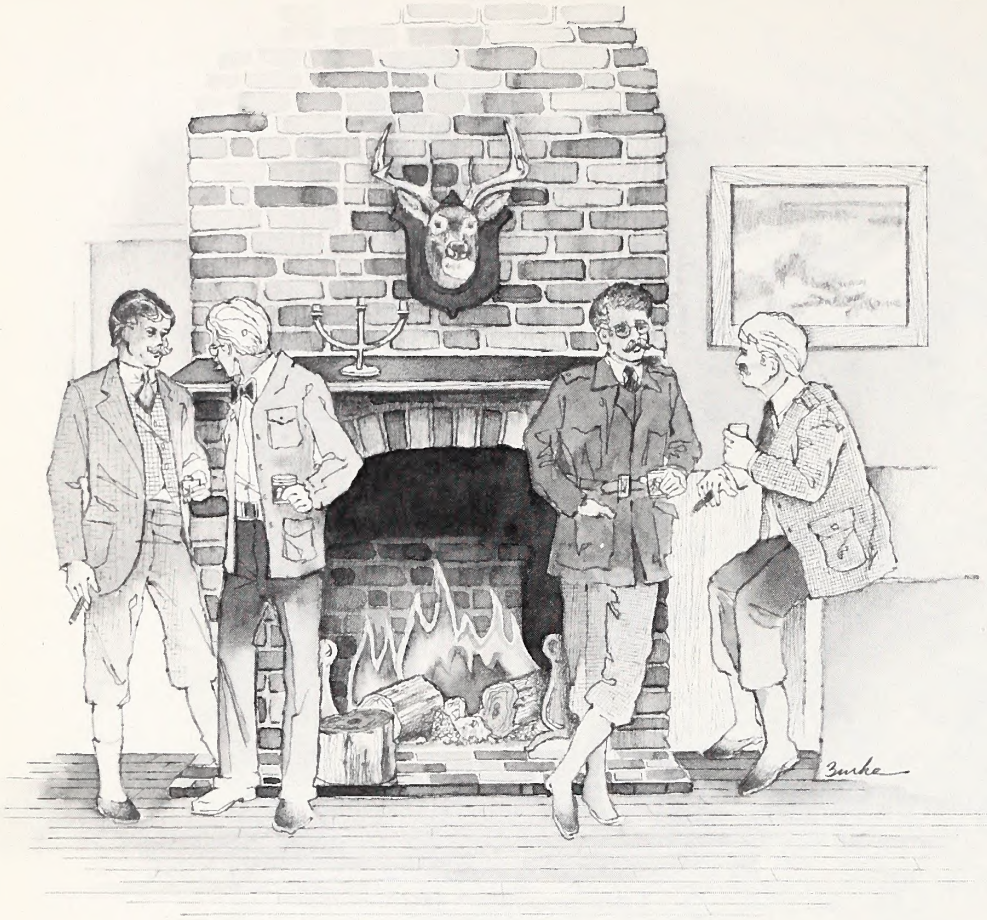
The key to good quail hunting, too, was land—plenty of it—and the North Carolina Piedmont had extensive tracts of woodland and field that made for classic quail habitat. But the sportsmen could never have taken advantage of the quail country around High Point had it not been for the Southern Railway, which was reorganized by J.P. Morgan in 1894 and which made North Carolina accessible to eastern cities. The line put High Point and Greensboro within 17 hours of New York. Commandeering a locomotive for the private railroad cars many of them traveled in, the sportsmen could quickly make their way via branch lines to points close to their lodges. Magnates could take a three-day holiday to shoot quail and still not miss a lick at the Stock Exchange.

Purchasing land was not necessary for quail preserves. With very little cash, a sportsman could lease the exclusive shooting rights to thousands of acres of farmland. William Ziegler paid 10 cents an acre for leased land, which must have been the going rate at the time. Thomas Gilbert Pearson, one of the founders of the National Audubon Society, wrote that in 1905, 153,000 acres of farmland in Guilford County alone were under lease by sportsmen. The fees totaled $7,500 which the farmers used to pay property taxes. So important were these leasing arrangements to the farmers that in 1903, when the North Carolina Audubon Society proposed a $10 non-resident license fee to pay for statewide game wardens, the farmers argued that such fees would scare away their Yankee patrons.

It's difficult to say who was the first to exploit the quail paradise in North Carolina's Piedmont. It is known that shortly after the Civil War northerners were in the area to hunt, but by the first decade of the new century many of the most important lodges and preserves were already in place. In Davidson County, wealthy New York stockbroker George W. Davis bought a 20-room house in Thomasville in 1894 that became the Thomasville Shooting Club. It eventually amassed 60,000 acres in leased land. Another club in Thomasville was the Rich Fork Shooting Club, formed in 1894 by Francis Brown of Philadelphia and hunting over a more modest 10,000 acres. In the 1900s, Frank Fleer built Cedar Lodge south of Thomasville.

Randolph County suited Ben T. English and Merley English who built establishments in Archdale, while Boston yacht builder John Payne Lodge beached himself in a house near Sophia a few months a year. In 1896, W. Gould Brokaw, grandson of railroad tycoon Jay Gould, bought 2,600 acres southeast of High Point for Fairview Park, the most fabulous of the lodges (leased 30,000 acres). New Yorker William Ziegler, who inherited the Royal Baking Powder fortune, built a commodious lodge on 150 acres 12 miles south of High Point (leased 18,000-20,000 acres).

Guilford County had a host of private



lodges as well. In 1899, two Baltimore millionaires, General John Gill and James Swan Frick, built a secret club in the village of Climax that was later to claim as members J.P. Morgan Jr. and several colleagues from J.P. Morgan and Company (leased 26,000 acres). O.W. Bright built his Colonial Revival house in the Whitsett vicinity in 1900. Pierre Lorillard put foundations down in 1903 (leased 10,000 acres), and a year later Clarence Mackay, owner of Postal Telegraph Company, built his lodge near Jamestown (leased 30,000 acres). Another scion of the Gould clan, son George J. Gould, built an estate over Guilford and Randolph counties in 1910 (leased 30,000 acres). John Blackwell Cobb, who had made his fortune with American Tobacco Company, built a Neo-Classical Revival lodge in present-day Sedgefield where today it serves as the clubhouse for the swells of the Sedgefield Country Club.

Of all these shooting estates, Fairview Park was without a doubt the most extravagant. Like so many of the second- and third-generation offshoots from 19th-century tycoons, W. Gould Brokaw may have lacked the predatory instincts for accumulating capital, but he had refined gifts for spending it. Reportedly he hired Stanford White of New York to design the lodge. One of the most eminent architects of his day, White fashioned a country confection that might have made even the Vanderbilts a little uneasy in the Biltmore mansion that had been completed in 1895. Three stories tall and 160 feet across, Fairview Park cost over a half million dollars and housed more sporting gimcrackery under a single roof than can be found in almost all health clubs of today.

The main entrance led into a large hall which opened into the formal living room. One set of doors swung into the dining room which sat 40 while another brought one into the billiard room which was comforted by an open fireplace at one end and divans for chatting and reclining. Leaving the billiard room you entered the library and next to it, strangely out of place, was a 25-foot-by-40-foot gymnasium, complete with punching bags, chest weights, rowing machine, foils and masks for fencing, and boxing gloves. There was a bath adjacent, and nearby the gun room. Running along the entire 160-foot length at the rear of the house was a sun parlor. A stairway led to the cellar where a squash court, Turkish bath, swimming pool, bowling alley and rifle range entertained the sports on a rainy day. On the second floor were 15 bedrooms.

Outside, guests could play polo, shoot clay pigeons, play golf or tennis. Presumably they found the time to shoot quail or even the pheasant that Brokaw had imported (an English gamekeeper accompanied the pheasant). One of the guests at a 1906 pheasant shoot at Fairview Park was Pearson who watched the line of beaters advancing through the woods and saw the pheasants running before them until they had to take wing over a low net at the edge of woods, where hunters could try their luck as the swift-flying birds flushed. In his autobiography years later, Pearson remarked: "I had witnessed a typical example of battue shooting as practised on some estates in Europe."

For 20 years Brokaw maintained this European-style sporting fantasy for himself and guests who included Franklin D. Roosevelt. After World War I, however, financial reverses forced him to turn Fairview Park into a club for wealthy hunters. In 1921 the fabulous lodge burned down. In the late 1930s a writer visited the old Fairview site and found only "Gaunt chimneys, ramshackled buildings, huge gates sagging on rotting gateposts, outbuildings decayed . . . ." It was an inglorious although classic end to Brokaw's Piedmont fairy tale.

The quail hunting that Brokaw and the others came for was memorable by any measure. A detailed picture of their style of hunting can be drawn from interviews conducted in 1968 by journalist Don Follmer, now Director of Public Affairs for the N.C. Department of Natural Resources and Community Development. He talked with elderly men who had worked for the lodges as dog trainers, estate and business managers.

"We'd have two guns and a handler to a party and start out about 10 in the morning," recalled Dewey Bulla. "Country was always too cut up to hunt off a horse, so we took buggies into the bad road area and used trucks or station wagons on the other part.

"If we had more than one shooting party," he said, "we'd split the lease into sections so we wouldn't be getting into each other's birds and we'd hunt 'til noon with one brace of dogs. Sometimes we'd eat lunch in the field or, if we were close enough, we'd go back to the lodge. After lunch we'd head back out, maybe two, three more hours, with a different brace of dogs."

The hunting was uniformly good, although it depended on who was doing the shooting. Bulla said that stirring up 18 to 20 covies a day was average, but that the Yankees were terrible shots. Ziegler himself was such a wretched shot that the handlers were in the habit of shooting birds the day before he went afield and sticking them in their pockets. "Ziegler would crack down on a covey and never cut a feather, but we'd say, 'Think you got one down over there,' and Ziegler would say he thought so, too. Then we'd walk over there and drop a bird and let the dog come

in. . . and retrieve." The handlers were afraid that Ziegler would get discouraged and quit the area if he kept missing.

On the other hand, W. Gould Brokaw was a crack shot, powdering "97 to 98 clay birds out of 100 consistently," according to John Peacock, who handled Brokaw's business affairs in North Carolina at one time. "I have seen him bag as many as 40 quail in a half-day's time, take them as they came," he said. At Climax Lodge, J.P. Morgan Jr. and company shot 5,590 quail from 1899 to 1904, testimony to the bountiful quail and the good shooting of club members. The club posted a daily limit of 40 quail per member.

Most of the lodges maintained enormous numbers of hunting dogs. Clarence Mackay kept 75 to 100 bird dogs; George J. Gould had an equal nimber. Ziegler, recalled Dewey Bulla, was such a passionate hunter that he transported dogs and handlers both to the western prairies to train during the summer. "Went to the Dakotas and later to Manitoba and got dogs steadied up on prairie chickens, sharp and fit when the season opened down here. Ziegler paid for the whole thing."

The building of hunting lodges in Piedmont North Carolina was a relatively brief phenomenon, a product of the era of unfettered wealth that flourished in the decades following the Civil War and that came to grief on the shoals of taxes, anti-trust laws and other 20th-century government controls that whittled down the discretionary income of the wealthy. In addition, the hunting itself was declining because of clean farming and the resulting change in quail habitat. Whatever the reasons, few new wealthy sportsmen sought the North Carolina clime after the first rush. Nevertheless, some of the hunting establishments persisted well into the century, like dinosaurs outliving their times. J.P. Morgan Jr. found peace of mind at Climax Lodge for nearly 40 years. He died on March 12, 1943, but six weeks before he had been in Climax for a week's shooting. William Ziegler continued hunting at his estate until the '50s. The Thomasville Shooting Club didn't dissolve until 1960.

Were the quail preserves good for the birds? Conservationist Thomas Gilbert Pearson thought so. Pearson defended the arrangements by which quail on vast landholdings were tied up for a few. ". . . the general plan (of leasing) seems to operate with almost universal satisfaction," he wrote in 1903, in the Third Annual Report of the Audubon Society of North Carolina. ". . . the Northern hunters kill but few birds, and leave much money in the State." He saw the key to wildlife conservation, evidently, in strict enforcement of game laws and the restriction of hunting to a few. He believed that leased preserves protected species like quail and helped farmers at the same time. ". . . we believe that by proper protection, large areas of our State can in time veritably be made vast game preserves, which will be a source of great wealth to the State," he wrote.

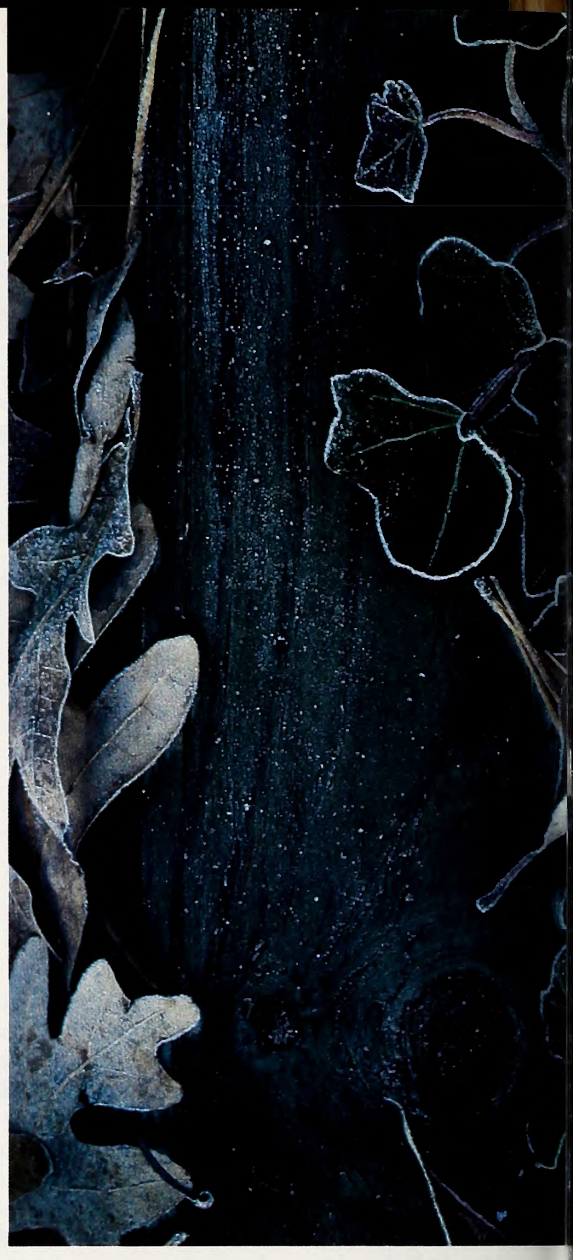
No doubt the farmers of the time benefitted from the leases of the northerners—such was the poverty that they knew. And many of the northern sportsmen exhibited genuine affection for the people they grew to know, although it was difficult to express it except in paternalistic ways in keeping with their class. William Ziegler held a party every November for the farmers he leased from. He donated money to the little one-room churches on his leasings.

Mrs. Arthur Welch of High Point recalls that in the 1920s, when she was a child of eight or nine, one of the members of the Thomasville Shooting Club spent Christmas there by himself. Mrs. Welch's father, Archie Primm, was the manager of the club from 1921 until his death in 1959 and the family lived in a house on the grounds. The member always sent beautiful French dolls to the Primm girls for Christmas and on Christmas morning he would walk down to the Primm's house where all five children would gather. There he received their thanks. Afterwards, the old man returned to the clubhouse. ⊠

# Ice Escapades

## Frozen water takes many forms this time of year, and the result is often uncommon beauty.

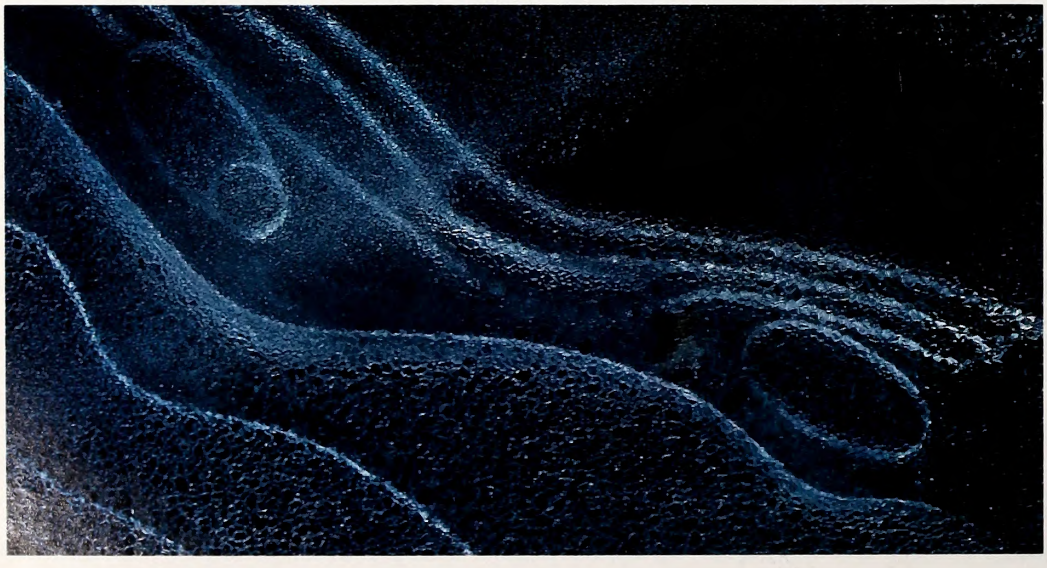
photography by Kerry Givens



Along streams and woodland paths, winter tightens its cold grip this time of year, and where dew sparkled on the morning grass and foliage a month or so ago, now there are fringes of ice. If you look closely, you will find nature's artwork displayed in myriad frozen forms. Along spring runs and streams, there may be portraits in ice gleaming like fine jewelry. An ice storm glazes the world in uncommon, short-lived beauty, and most any early morning finds leaves and grass wearing a lacy fringe of crystal.

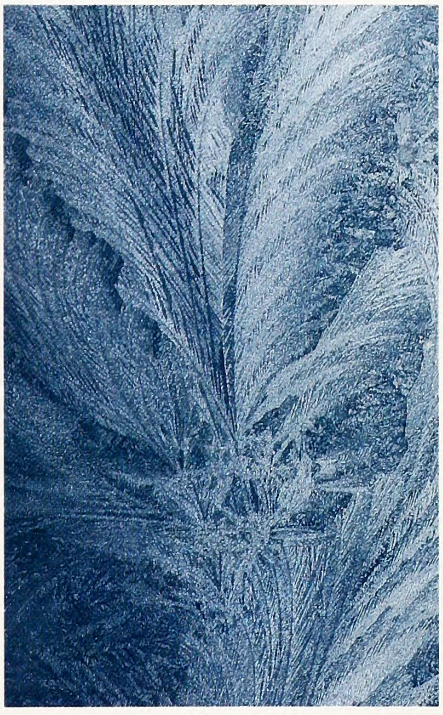
Bundle up and go outside for a leisurely walk. You will surely find that this low ebb in nature's cycle of seasons has its moments, and a visit to this glittering gallery is the perfect counterpoint for a warm fireplace and a cup of hot chocolate.

***Streamside ice** captures ripples and bubbles.*



***Fringes of frost*** *on oak leaves and ivy.*

***Feathers*** *of frost on windowpane.*

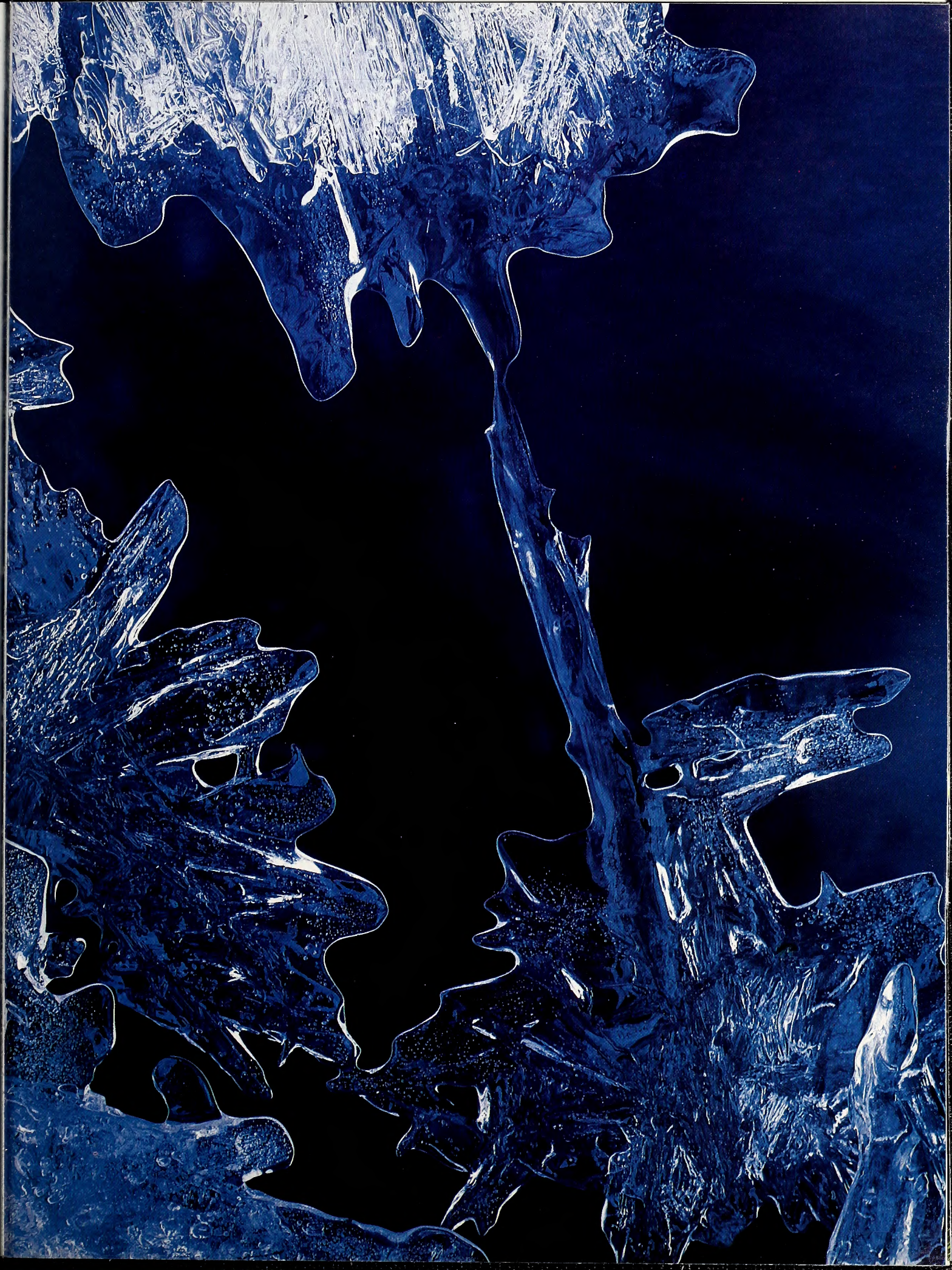


***Freezing rain*** *glazes oak leaf and pine needles.*

**Icy sculpture** *along frozen rim of creek.*

**Oak and birch leaves** *trapped in river ice.*

**Ice storm** *coats domestic holly.*



*Wildlife Gets Greater Emphasis*

# Pisgah And Nantahala National Forest Plans Revised

*Written and Edited by Mark Taylor*

Wildlife Commission fisheries and wildlife biologists have been working closely with the U.S. Forest Service to see that wildlife and fisheries needs are more thoroughly addressed in the second proposed development plan for long-range management of the Nantahala and Pisgah national forests.

The first proposed 50-year management plan for the forests would have almost tripled construction of new roads and increased the timber harvest by a third. It also recommended that only one of five wilderness study areas be submitted to Congress for wilderness designation.

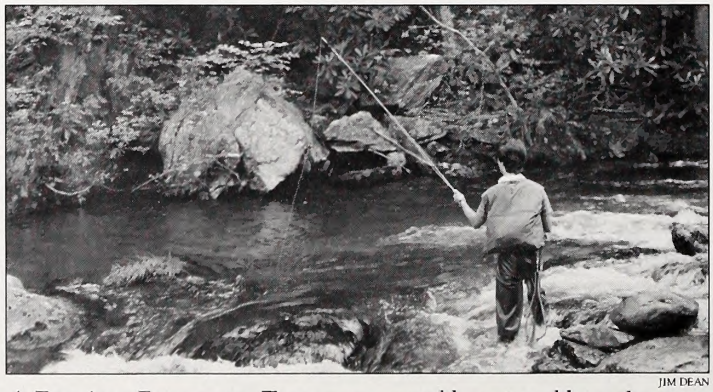
As a result of public outcry, the Forest Service has issued a second proposed plan for public review. This modified alternative reduces new construction of roads from the current 60 miles annually to 40 miles, and calls for a slight reduction in reconstruction of existing roads. Timber harvests would be maintained at current levels, but a greater emphasis would be placed on the more aesthetically appealing selective and shelterwood cuts (the original plan called for only clear-cutting and thinning of stands). A special riparian zone is proposed along streams and lakes to protect fisheries, and a greater emphasis would be placed on non-motorized recreation such as hunting, fishing and hiking. Three of the five wilderness study areas—Lost Cove, Harper's Creek and Craggy Mountain—would be recommended for wilderness designation. Also, the 50-year plan was changed to a 15-year plan with opportunity for periodic review. The Forest Service has reviewed public comments on the second plan, but at press time had not released the final plan to the public.

"All in all, we feel that we made a lot of gains in the recommendations included in the second plan," said Commission wildlife biologist Allen Boynton of Morganton, who reviewed the plan. "Much of the logging and road construction that was proposed for the more primitive areas of the forest was eliminated. Provisions also call for greater retention of key "hard-mast" producing areas for wildlife, increased emphasis on maintaining old-growth forest, and better protection of riparian or streamside areas which not only are essential to fisheries, but are also heavily used by many wildlife species."

The second plan also calls for greater protection of fisheries.

"We have several areas of concern," said Wildlife Commission fisheries Biologist Jim Borawa of Asheville. "The first is that streams be protected, and the second plan recommends that undisturbed streamside buffers be used to protect trout streams and other waters from siltation, warming water temperatures, and other problems associated with logging and construction of roads. We're also concerned about development within the watersheds of our prime trout streams, and are pleased to see that logging and road building has been reduced considerably in the second proposal—especially in the less-developed area of the forests. A third concern is the use of off-road vehicles, which contribute to siltation. New proposals would limit their use, and a greater emphasis would be placed on non-motorized recreation. Many of the measures that protect our waters also benefit many wildlife species. We've worked closely with Forest Service officials in addressing fisheries needs in the second plan."

The Forest Service has also issued its final, 15-year management plan for the Croatan and Uwharrie national forests. The original plans would have allowed peat mining on 6,000 acres, and "surface-water management" or ditching and draining of 60,000 acres of pocosin for timber management, on the Croatan National Forest. The public objected, and in the final plan peat mining was eliminated and all pocosins were classified as "unsuitable for timber production" and will be left in a natural state. A greater emphasis will be provided on managing for old-growth forest, which provide habitat for black bears and wild turkeys. Timber rotations for shortleaf, longleaf, and loblolly pine were also lengthened to provide better habitat for endangered red-cockaded woodpeckers.



JIM DEAN

***A Precious Resource:*** *Trout streams would receive additional protection from streamside buffers in the revised management plan proposed for the Nantahala and Pisgah national forests.*

## Beaver Ponds A Cash Crop?

How can a landowner with a beaver pond turn a problem into an asset? How can a sportsman find a good place to duck hunt or trap furbearers? The answers may lie as close as your local county agent of the N.C. Agricultural Extension Service.

The Agricultural Extension Service is now operating clearinghouses to lease beaver ponds in many areas where beavers cause problems. This concept was developed by a beaver-management task force established by the Wildlife Commission. Beaver populations are rapidly expanding, and while beaver ponds offer excellent habitat for waterfowl and other wildlife, flooding can cause problems for landowners. Leasing the hunting, trapping and fishing rights to beaver ponds, however, may turn a liability into a cash crop. Extension agents will maintain lists of landowners who wish to lease the hunting, fishing and trapping rights to beaver ponds, and will help sportsmen contact these individuals.

*Big Walleye, Striper Hybrid Caught*

## Anglers Set New Fishing Records

North Carolina has two new state record fish. A record walleye was recently confirmed from Lake Chatuge in Clay County, and a record striped bass-white bass hybrid was confirmed from Tuckertown Reservoir in Davidson County.

The record walleye was caught by Lamar Cofer of Lilburn, Georgia, in the Shooting Creek Arm of Lake Chatuge on August 16. The fish was 30½ inches long, had a 20-inch girth and weighed 13 pounds, 8 ounces. The fish was caught on a 15-year old lure—an Old Faithful spoon—and replaces a 13-pound, 4-ounce fish caught by Leonard Williams in 1966 in Santeetlah Reservoir.

The white bass-striped bass hybrid was caught by Steve Patterson of China Grove on April 12. The fish was 30 inches long, had a 26-inch girth, and weighed 16 pounds, 12 ounces. It was caught on a Little Fishie Shad, and replaces a 14-pound, 9-ounce fish caught in the Yadkin River only six days earlier by Clarence Smith.

The Wildlife Commission's Division of Boating and Inland Fisheries recently assumed responsibility for maintaining freshwater fishing records from the N.C. Division of Travel and Tourism. The N.C. Division of Marine Fisheries in Morehead City is responsible for maintaining records for saltwater fish.

KAY SCOTT

***A Long Time Coming:*** *Lamar Cofer's catch of a 13-pound, 8-ounce walleye breaks a state record that has stood for 20 years.*

## Field Notes

-Eastern, central gun deer seasons open through Jan. 1.
-Northwestern gun deer season closes Dec. 6.
-Western gun deer season closes Dec. 13.
-Eastern bear season in certain counties open through Jan. 1.
-Second half western bear season Dec. 15-Jan. 1.
-Second half wild boar season Dec. 15-Jan. 1.
-Squirrel seasons open through Jan. 31, except fox squirrels which close Dec. 31.
-Grouse, quail, rabbit seasons open through Feb. 28.
-Western raccoon season open through Jan. 31.
-Eastern raccoon season open through Feb. 28.
-Western bobcat season Dec. 15-Jan. 31.
-Eastern bobcat season Dec. 15-Feb. 15.
-Third segment dove season Dec. 19-Jan 10.
-Third segment duck season Dec. 15-Jan. 17.
-Sea duck season open through Jan. 17.
-Brant season Dec. 19-Jan. 17.
-Snow goose season open through Jan. 31.
-Canada goose season Jan. 1-17.

Check the 1986-87 regulations digest for information on bag limits, season zones, and either-sex hunts. Copies of waterfowl regulations are available from license agents or the Division of Wildlife Management, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

The Wildlife Commission strongly recommends that all hunters wear hunter-orange clothing when hunting big and small game.

**Regulations Change: Hunters are reminded that the canvasback season is closed throughout the Atlantic, Mississippi and Central flyways.**

*Reader Shares Observations*

## Hummingbirds Put On A Show

Dear *Wildlife:*

Watching and photographing the summer visits of ruby throated hummingbirds is always a special treat for me.

I was beginning to wonder if I would have that pleasure this year when the month of June passed and still no birds appeared. They finally came in force during the second week of July, and the wait was worth it.

After they had been feeding regularly for about a week, I saw a female swinging in an arc over a bed of Impatiens. It was a movement I had never observed before, and caught my attention. Something moved below her among the flowers and I realized that I was being privileged to see a rare sight—a mother hummingbird standing guard while her fledgling fed. The same action was repeated on some nearby petunias.

The mother then fed from a feeder, and they rose together straight up and she "refueled" her baby in mid-air. As I continued to watch, it became obvious that the mother bird was teaching the fledgling aerial maneuvers. Baby now flies with the best of them, and has staked out her own favorite feeder and perch.

Several weeks later, my neighbor and I witnessed an equally amazing sight. After quite an exhibition of flying together, a pair mated—not in the air—but on my driveway.

Their aerial acrobatics continue to amaze me, but I doubt if I'll ever again see anything quite so unique from those wonderful, little birds.

—*Mrs. Marie Evans*
*Greensboro*

*Passing On Family Tradition*

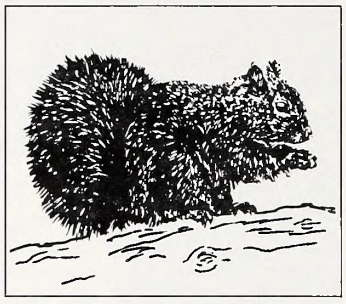
## Father and Son Squirrel Hunt Kindles Fond Memories

Grandaddy, guess what we got! Want to see? Come look at our squirrel"

My son's grandfather had seen many squirrels in his life, but he knew that few things generate more wonder in a child's mind than experiencing the outdoors. My father taught me a great deal about life in the forest when he took me squirrel hunting at a tender age, but it wasn't until I took my own four-year old son on his first "hunt" that I realized what a great experience it was.

No other hunting allows the teacher and student better opportunities to experience wildlife behavior and gun safety. My son was equipped with a toy gun, but one of the conditions was that it be treated and handled as though it were real. Moving slowly and quietly, talking sparely if at all, and lifting feet rather than shuffling through dry leaves and twigs are all strange to a four-year old. The toy gun almost seemed to have a magnet on the muzzle that pulled it in careless directions, but patience on early trips would make for a safer, more successful hunter in years to come.

With all of this in mind, Jimmie and I prepared for our first squirrel hunting trip. He had to make sure he had all the proper clothing including boots, hunting hat, and a blue bandanna. My preparation involved choosing where this grand hunt would take place. I knew the perfect spot. It was a hardwood stand where it was easy to walk and see squirrels. There was also plenty of "sign" such as cracked acorns and leaves that had been disturbed in search of nuts, so he could learn to find squirrels when he couldn't see them. I had a deer stand in these woods, and had once shared the tree with no



less than four squirrels.

The morning we went was a bit cold for little fingers, and we sat in the truck on a logging road in hopes of seeing a deer while we waited for Sol to warm the air a few degrees. Just after sunup, a pretty doe and two yearlings walked across the road and picked at the grass on its edge. A covey of quail and a redtailed hawk also graced us with their presence, and I answered no less than a hundred questions.

"Let's go, Daddy," Jimmie said, more anxious than ever. So, we walked into the woods and began our squirrel hunt.

As we walked through the dry leaves, I learned that a 42-pound boy can make every bit as much noise as a full-grown black bear. It was impossible to avoid vines and briars, which tugged at his gun and claimed his blue bandanna somewhere along the way. But, all things considered, we moved along rather well and encountered another covey of quail, two hawks, a deer which bounded off through the reeds, and many small birds. At one point I raised my rifle to get a better look through the scope at a finch and heard a click of metal. I looked down to see my partner with musket raised and cocked in the direction of the finch whispering "where's the squirrel." We moved on after a quick lesson on identifying game prior to cocking the gun and showing him how to release the hammer without having his gun "shoot."

After I had answered another 50 or so questions, I heard a squirrel chatter about 50 yards behind us. We moved slowly that way one tree at a time until I saw not one, but two squirrels in a large oak tree. We stood silently behind an oak waiting for them to show themselves. After a few anxious moments, one of the squirrels ran out on a branch and stopped. As I shot and the squirrel fell, Jimmie began moving towards it. "Stay still and wait for the other one," I said.

"You said we were going to shoot one squirrel, Daddy," he replied. So, we walked towards the squirrel. After he had searched unsuccessfully for a couple of minutes, I explained the importance of marking the tree when you shoot and directed him to the fallen squirrel.

He picked up the squirrel by its hind legs, and held it up as if it were a prize trophy. Then, with his rifle perched on his shoulder and swinging his squirrel, he started back to the truck. "Daddy," he asked. "We're the best squirrel hunters in the whole world aren't we?" "Well yes," I said, "I reckon we are."

Arriving at the truck, we decided that the squirrel would best be left in back until we dressed it. As we drove to my parents' house I thought of how much fun I'd had for a net cost of one .22 bullet and a blue bandanna.

Jimmie recalled all the details of the morning, and asked another 30 questions or so as we drove the five miles home. As soon as the truck stopped in the driveway he ran into the house calling, "Grandaddy, guess what we got. Want to see it. Come look at our squirrel."

I thought that was fitting, since it was his grandaddy who had started it all years earlier with another small boy.

*—Jim Overton*
*Raleigh*

## Chapter Honored

The Rocky River Chapter of Trout Unlimited in Charlotte recently received the 1986 Gold Trout Award. This award is presented by Trout Unlimited to the best of its 415 chapters nationwide.

The Rocky River Chapter was cited for excellence in conservation programs and growth. The group's biggest project has been the restoration of Little Frankum Creek in Caldwell County. For the past two years, the chapter has worked with fisheries biologists from the Wildlife Commission and the Forest Service to install rough-fish barriers and improve trout habitat in the stream prior to stocking. Another project was the construction of a simulated trout habitat—complete with a waterfall and live brook, brown and rainbow trout—at Discovery Place in Charlotte. In addition, the chapter averaged a 50 percent annual growth rate in membership, and nets an average of $10,000 for conservation projects at its annual fund-raising banquet.

The chapter is also working with other Trout Unlimited chapters on five projects, which include a second trout exhibit at Discovery Place and development of a fishing area for the handicapped in Caldwell County.

Fishermen who are interested in the organization should write to the Rocky River Chapter of Trout Unlimited, Box 456, Matthews, N.C. 28105.

*Many Businesses, Individuals Take Part*

## Wildlife Month Considered Success

Wildlife plays an important part in the lives of many North Carolinians, and this past November was proclaimed the first "Wildlife Month In North Carolina" by Governor James G. Martin.

"It's too early to tell what the results are, but we'd certainly like to thank all of the businesses who took part in Wildlife Month In North Carolina in November, and all of the individuals who purchased a lifetime license, magazine subscription, or made a tax-deductable contribution to the Wildlife Endowment Fund," said Jerry Wright of Jarvisburg, chairman of the N.C. Wildlife Resources Commission. "The purchase of Conine Island and four other tracts of bottomland hardwood forests on the Roanoke River is one example of the kind of project supported by this fund.

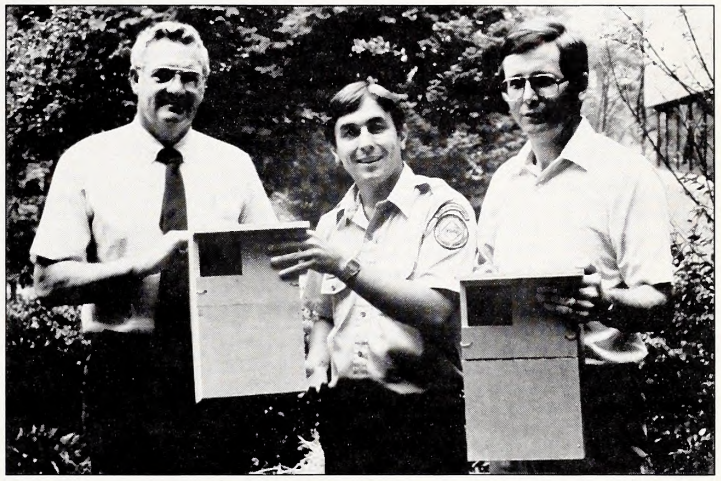
"Others include the support of youth hunting and fishing programs, such as CATCH (Carolina Anglers Teach Children How), publication of the *Carolina Notebook*, a free conservation-education primer which is mailed to over 7,000 teachers six times per year, and the mailing of *Wildlife In North Carolina* magazine to all school libraries. The Wildlife Endowment Fund supports such a broad range of projects that everyone benefits. We urge everyone to continue to support this fund, and make every month Wildlife Month In North Carolina."

One of the goals of Wildlife Month In North Carolina was to support wildlife conservation projects through promotion of the North Carolina Wildlife Endowment Fund. As part of this effort, applications for lifetime hunting and fishing licenses and subscription blanks for lifetime subscriptions to *Wildlife In North Carolina* were distributed by businesses across the state.

For information on the Wildlife Endowment Fund, and applications for lifetime licenses and lifetime subscriptions to *Wildlife In North Carolina* magazine—write to the WILDLIFE ENDOWMENT FUND, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

*Donated By Telephone Pioneers*

## Nest Boxes Help Flying Squirrels



***New Homes:*** *The North Carolina Chapter of the Telephone Pioneers of America recently built and presented 100 squirrel boxes to the Commission's Nongame and Endangered Wildlife Program. These boxes will be used to provide winter homes for endangered northern flying squirrels, which are found on only a few peaks in North Carolina.*

*From left to right are Vernon Henderson of Southern Bell in Lenoir, chapter chairman, Allen Boynton, Commission nongame project leader for the Mountains, and Jerry Richardson of Southern Bell in Lenoir, environmental co-chairman for the Blue Ridge Council of the Telephone Pioneers.*

## The Wildlife Endowment Fund Report

The Wildlife Endowment Fund is supported by the sale of lifetime licenses, lifetime subscriptions to *Wildlife In North Carolina*, and tax-deductible contributions. Only the annual interest from this fund is used for wildlife conservation, and the fund will play a key role in supporting wildlife programs in the future. Interest is earned through investments made by the State Treasurer's Office. For more information, write to the Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

**Status on August 31, 1986**

| | Numbers Sold | Revenue Received |
|---|---|---|
| Lifetime Sportsman's License | 20,599 | $6,135,956.41 |
| Lifetime Hunting License | 139 | 28,337.14 |
| Lifetime Fishing License | 1,386 | 236,874.46 |
| Lifetime Subscriptions to Wildlife in N.C. | 797 | 97,689.59 |
| Contributions | — | 76,814.85 |
| Fund Total | | $6,575,672.45 |
| Total Interest Earned | $1,313,908.64 | |

## Calendar Of Events

**December 3-4**
Central Carolina Farm and Home Trade Show at the Carolina Farmer's Coop Warehouse in Smithfield.

**December 6**
Civil War Encampment at the Fort Fisher State Historic Site at Kure Beach.

**December 14**
Colonial Christmas and Candlelighting at the Schiele Museum of Natural History in Gastonia. Features Christmas customs, food, dances, carols and decorations of the 18th century.

**December 17**
Anniversary and Commemoration of the First Flight at the Wright Brothers National Memorial in Kill Devil Hills.


# A TIME FOR GIVING...

## The 1987 Wildlife Calendars have arrived.

Larry Barton, Bob Dance, Sallie Middleton, Bob Henley, and Alan Cheek are among the artists featured this year. You will also find information about wildlife, hunting seasons, boating access areas, ferry schedules, and much more.

For art reproductions suitable for framing and information for use throughout the year, order your wildlife calendar today! **(But hurry, last year we sold out!)**

Please send me ..... N.C. Wildlife Calendars at $6.00 each $_____
Wake County residents add $.30 sales tax per calendar _____
Other N.C. residents add $.18 sales tax per calendar _____
Enclosed is my check for ..... Total $_____

Name _____
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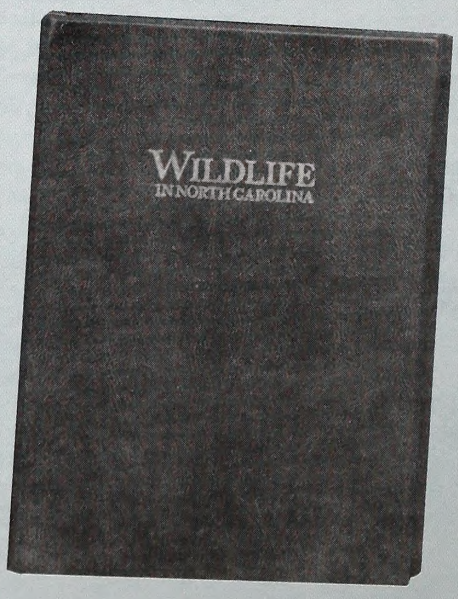
Phone (_____) _____

Send order to: CALENDAR; N.C. Wildlife Resources Commission; 512 N. Salisbury Street; Raleigh, N.C. 27611

All orders must be prepaid. We do not bill. A $10.00 charge will be made on returned checks. (N.C. G.S. 25-3-512).

**For fund raising and bulk rate information (10 calendars or more), call 919-733-4567. Please allow 4-6 weeks for delivery.**

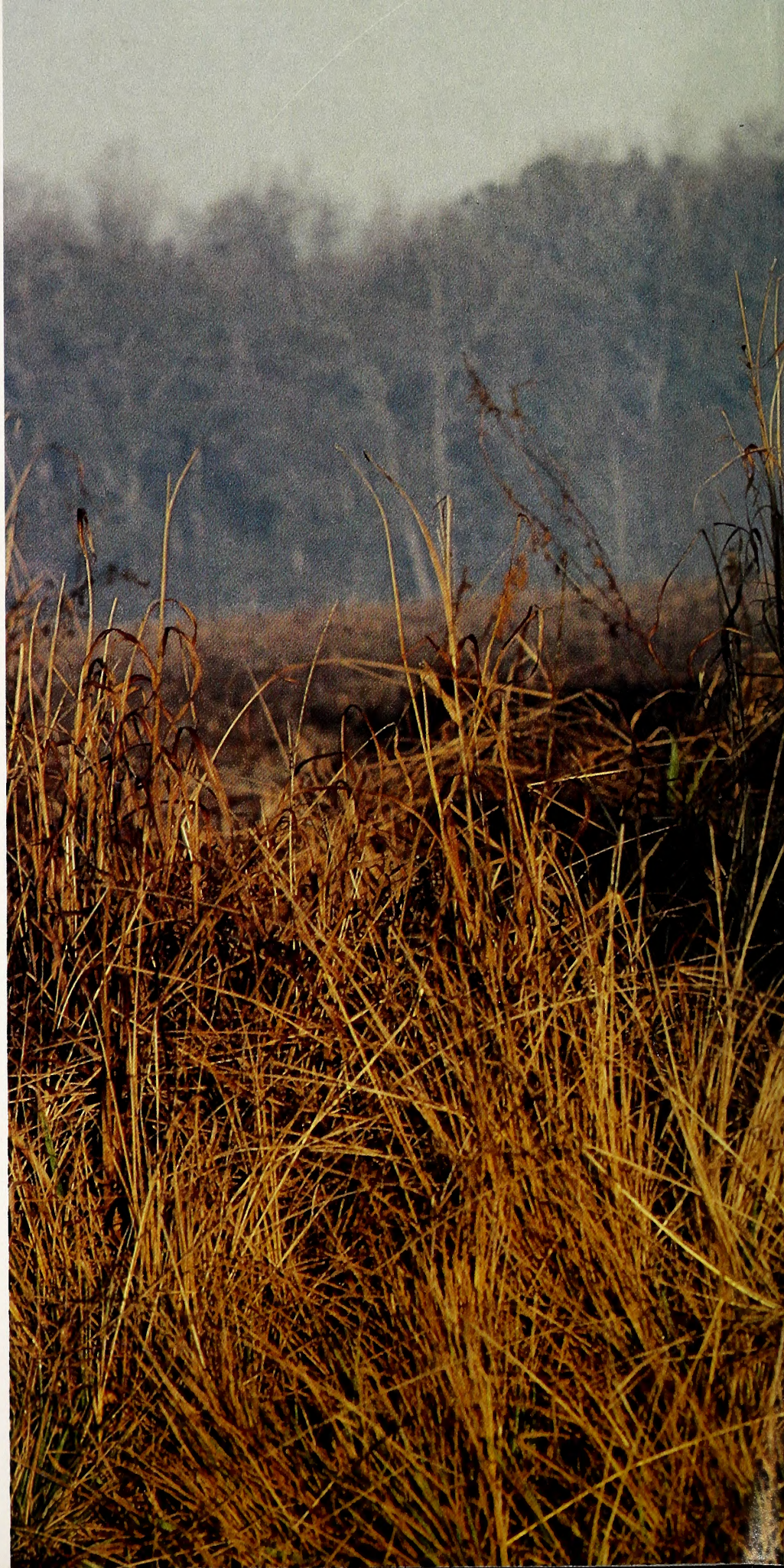
ORDER TODAY!



# The timeless gift.

*Your gift of a lifetime license or magazine subscription lasts a lifetime.*

(For more information, see the opposite page.)



**Late Season Doves**

Fewer hunters take advantage of the second half of the dove season, but that may be a mistake.

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